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ABSTRACT

Volume 4 of the six-volume articulated elementary education career guides deals with the beginning occupational competency level of career awareness and aims at developing student employable skills. The lessons in the volume are divided and color-coded by grade level (early childhood, primary levels 1-3, and intermediate levels 1-3 corresponding respectively with grades K-6), and are categorized by subject area and career cluster (12 clusters in all). Each lesson includes references, instructional objectives, input (procedures), output (activities), and evaluation. Learning activities focus on a beginning understanding of work skills. Representative unit titles include: "Discovering Apples," for early childhood; "Wheels That Help Us Work," "Making Rock Critters," and "Career Education Assists in Teaching Maps and Globes" for primary levels; and "Electrical Workers in the World of Work," "Simulating Weather Forecasting," and "Building a City" for intermediate levels. Altogether there are two lessons for early childhood, 10 for the primary levels, and 12 for the intermediate levels. (JR)

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Volume

# Elementary Career Education Guide

4

# BEGINNING COMPETENCY

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Career Development Project

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Watertown, S. Dak. 57201

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## DEDICATION

This resource guide is dedicated to the Watertown elementary faculty, their principals, and administrators.

It is evidence of their work and commitment to the main thrust of the Career Development ideal, the self-actualization of every student who passes through the Watertown school system.

A special salute is made to the school board and residents of the Watertown community. Without their support these lessons and units would not be written.

Career Development Project

Watertown Ind. School Dist. No. 1

435 Tenth Avenue N. W.

Watertown, South Dakota 57201

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August 1973

## PREFACE

The elementary faculty members of Watertown hope that the pioneering efforts expressed in this resource guide will assist other educators in converting their curriculum to one with a Career Development impact of their own creation.

The Career Development staff is grateful to other Career Development projects for their sharing of guides and materials, the influence of which cannot always be calculated fully.

It is not the thought of the Watertown teachers that this resource guide is complete and flawless. It is built to enhance the existing curriculum in Watertown, and to express the genesis of a new way of approaching education for American children. This is articulated to better prepare students for the multi-demands of the World of Work in a technological society. New ways of meeting this challenge continue to reveal themselves to our staff members.

The authors of this resource lesson guide desire to remain open to the challenge of the future and expect to continue to change as better methods appear to be successful with students.

Watertown teachers are excited by the possibilities of their Career Development Program and the motivating force which it provides for pupils such as this third grader, who, sans, grammatical accuracy, yet with poetic expression summed up how he felt about a field trip in this way, "I had joy all over me when I saw 'them' interesting things they were doing... and I remember what you said what 'them' logs were. Here is the answer, railroad ties, and I thank you truly for 'tacking' us there." There is, also, the sophisticated note to President Nixon from a fifth grade boy just before the 1972 election. "If you do as well in the elections as you did in the mock elections at our school, you will win...I am getting a very good 'grounding' in being a superintendent of schools." Then, there was the fourth grader who wrote under an illustration, "Be polite when you ask for a job, and look 100%, and get right to work, and help others. Are you polite when you ask for a job?" Watertown teachers expect to continue to add worthwhile and viable material to this guide and do not feel that its production is finished. Will you, also?

# INTRODUCTION

## CAREER DEVELOPMENT "A, B, C's" FOR THE TEACHER

Helen K. Dickson
Elementary Curriculum Specialist
Career Development Project

### WHAT IS THE GOAL OF CAREER DEVELOPMENT?

The goal of Career Development for K-12 is the self-actualization of every student. When a student understands himself in true perspective, he will be able to realistically set life-time goals and meet them. He needs to know his strengths. He needs to understand and be able to deal with his weaknesses.

### WHAT COMES BEFORE SELF-ACTUALIZATION?

In order to have achieved these top priorities, he needs to have developed a set of values capable to assisting him to a sound philosophy of life. He needs, also, to have made a career choice, thereby gaining some individual autonomy in his life. He needs to feel, and have others agree that he can make mature decisions.

### HOW CAN COUNSELING HELP?

Counseling can assist students toward making decisions which lead to self understanding. It can help these students resolve problems and lead them to relative happiness-success through their value setting.

### WHAT HELPING ROLE DOES CURRICULUM PLAY?

A curriculum geared to Career Development can help students toward wise career choices through a diverse knowledge of the World of Work and the occupations it contains.

### THE MOTIVATING FORCE OF CAREER DEVELOPMENT

In Career Development children are provided with a strong motivating force for becoming educated by relating careers and the World of Work to their existing studies. This can be achieved through an active blending of the academic with the vocational, integrating one into the other, and producing an educational impact which makes SENSE to the student, thereby releasing his human potential.

WHO COUNSELS IN ELEMENTARY SCHOOLS?

On the elementary level, trained counselors are few. Their work is diffused and meaningless to many of the children they need to serve through no fault of the counselors themselves. Existing counselors are overburdened at best, and find it virtually impossible to meet the demands of the work which confronts them. Effective counseling, then, falls squarely into the hands of the teachers, burdened as they are, and confronts principals whose training has often been authoritarian-centered, a highly acceptable approach in other moments of our nation's development. Career education provides a format for teacher-counseling action.

WHY ARE NEW TECHNIQUES DEMANDED?

Technology, the burgeoning increase in population, the rise and needs of minority races, changed concepts of morality in many homes. The losses of identity for many individuals, especially in the ghettos of our cities, have created an entirely different and often crushing demand on the schools, their administrations, and their teachers. Career education can assist students in finding and understanding themselves and others.

WHAT CAN ELEMENTARY TEACHERS DO?

Personal Recognition of Students

In every small way a teacher can maneuver, (s)he should let students know (s)he cares for them as individuals. A look, a pat, a chuckle go a long, long way.

William Glasser, psychiatrist, and author of Schools Without Failure and Reality Therapy in Los Angeles schools, advises teachers that students are role-oriented today. Because they see themselves being gobbled up by technological society as a number in place of a name, they feel the urge to establish their individual role as a person. From this base they will set their goals, and not before. Teachers, therefore, are challenged to teach from an individualized approach in basic skills such as reading and math. They can, also, recognize the student in individual acceptable personal ways. Goal setting is important to a student's future occupational success. Self understanding will assist him toward decision making when the time comes for it. This understanding should begin very early in a child's formative years.

Decision Making Techniques

Teachers can assist in decision making by encouraging participants in lessons requiring the use of techniques such as the inquiry method, brainstorming, and problem solving. These techniques, learned in the early years, will be applied easily later when career decisions are at hand. They are basic elementary practices in preparation for future years.

Inquiry requires the use of questioning approaches to discussion, while brainstorming includes the outpouring of idea after idea with free wheeling encouraged. Problem solving requires the participants to decide precisely what the problem is, and then suggest a myriad of possible solutions. When many solutions have been contributed the group involved in decision making decides on the best of the possible solutions. These methods need to be established early so that they can be easily used in life decisions.

## Counseling-oriented Lessons

Many counseling-oriented lessons can fit smugly into the informal part of the school day, just before or just after recess and before going home. They can include the teacher-selected books which point to value judgments, child-teacher cooperative creative writing having to do with personal feelings, filmstrips illustrating the needs in personality development, and publishers' curriculum kits which cover the entire gamut of feelings and value judgments. Throughout this guide teachers have been referring to curriculum materials and ideas which will be effective in teaching these lessons.

These do not replace Sunday School; they supplement its challenges, not through moralizing, but through assisting students not only to understand themselves, but, also, to understand others with whom they come in contact.

## Curriculum-oriented Lessons -- The Curriculum Recipe

Let us reason, now how a teacher can plan Curriculum. Take any lesson which a teacher needs to teach, analyze it for the possibilities of integrating any of the eight different levels of Career Development awareness and some of the goals which are represented within them. What can one most readily teach presenting the subject matter in its best light? Will it be self, career, economic, or education awareness? Will it be appreciation-attitudes, beginning competency, decision making or employability? Perhaps to make the lessons especially dynamic several of these objectives may be accented. The teacher should make these decisions on the basis of the World of Work goals fitting the awareness levels which are most effective for these particular lessons.

## Curriculum Tips Toward A Successful Recipe

Now the teacher plans his approach! What occupational cluster will be represented? To what developmental stage does he hope to appeal? What will the teacher present in the way of INPUT to the lesson? How should the children be grouped while receiving the teacher's information? Should they be quiet through the entire INPUT, respond in unison, read and recite, or what? Now, what OUTPUT in the way of activities are the children going to produce? What performance achievement is expected of them? Will they show improvement in understanding concepts and generalizations? How will these be measured in a pre-test and the post-test? What will students actually have learned in the way of factual information that was geared to the World of Work?

Checking Recipe Ingredients

Now, it is time for the teacher to check his plans. Is there some way that this lesson can be more humanistic slanted? Can technology be placed second rather than first? Remember, technology never invented anything. PEOPLE did! Technology does not make faultless checks on technology. PEOPLE often have to be called in to double check and regulate computer decisions. A case in point is the computerized rapid transit system problem in San Francisco. When materials move down an assembly line, it is PEOPLE who made it possible, not the machines. Anyone teaching students should keep this fact well in mind, and transfer the thinking successfully and dynamically to students.

Let us assume that a teacher has checked on the human approach to the lesson. Is every activity in the OUTPUT? Again, is it all 3-R activities which have been written in, or does the teacher have pupils groupingk and regrouping for vocational type enhancement as well as concrete-abstract teaching?

Next, check to see if students are to be exposed to a resource person on a field trip, and if so, are teachers going to follow advice in CAREER EXPLORATIONS, DESIGNS FOR FIELD TRIP REPORTING, or does anything suffice that might happen on the trip? (See Eric System VT 016 122; Order from: University of South Dakota Library or State Library Commission).

Finally, is the teacher planning at least one of the ten ways outlined in the booklet, CAREER EXPLORATIONS, to reinforce the field trip? Has (s)he thought of a creative reinforcement method of his or her own? Or, are results of the field trip lost forever in a maze of irrelevant published lessons which might appear to be high priority items to the teacher when (s)he returns with the class?

EVALUATING RECIPE OUTCOMES OF CAREER DEVELOPMENT PLANNING

The teacher may have developed a mini-unit, a maxi-unit, or an individual lesson, but it should be integrated into the regular curriculum; it should be relevant; it should be active and contain concrete experiences to blend with abstract concepts which are meaningful. This means active participation to illustrate passive ideas, i.e., the order of the successful Career Development units. These can and will, in a dedicated scope and sequence, lead toward SELF-ACTUALIZATION for every student. This is exactly what Watertown teachers were attempting to do when writing lessons printed in this guide.

Each one who moves from early childhood throughout adulthood, in a powerful curriculum such as this, should be more ready to do as Dr. Helling of the University of Minnesota suggests, successfully "integrate self with society" lasting an "entire life."

Could anything be more challenging for the 70's than this? In accomplishing this objective of the 70's, one is planning for the successes of this nation and its people for the 80's, 90's and the year 2000 A. D.

## CAREER DEVELOPMENT RATIONALE AND THEORIES

RATIONALE:

After reviewing the literature in regard to Career Development theory, and discovering the works of Ginzburg, Ginsburg, Axelrod and Herma, Donald Super, and those of John Holland, as well as others, one reasons that an understanding of the theories should assist greatly in the development and understanding of curriculum.

THEORIES:

According to Samuel H. Osipow, Prof. of Psychology, Ohio State University, we know a number of generalizations about career development. It is a socially bound process, is characterized by changes both within the individual and external to the individual, is often accompanied by anxiety, the fear being implied of choosing something at which one may fail, and choosing something that one does not like. Abilities play an important role in Career Development and interest serves as a predictive "ceiling", while abilities serve as a predictive "floor".

John Holland expresses the idea that there is something systematic about Career Development preferences. They seem to come about in a developmental manner and are facilitated by particular tasks in significant institutions.

Ginzburg's theory "is developmental in nature of the process" of vocational change, and Super's theory lists life stages of vocational development. The table below compares the two theories as they relate to school children:

| Ginzburg: | Super: |
|---|---|
| Fantasy Period - Birth - 11 years | Growth Period - Birth - 14 years |
| Tentative Period - About - 11 years | |
| A. Interest-Identification and Understanding | A. Fantasy: Age 4-10 |
| B. Capacity-Abilities-Values | B. Interest: Age 11-12 |
| C. Transition-Composite View Interests Values Capacities | C. Capacity: Age 13-14 |
| | Exploration Period - Age 15-25 |
| | A. Tentative: Age 15-17 |
| | B. Transition: Age 19-21 |
| | C. Trial: Age 22-24 |
| Realistic Period - Around 18 years | |

Roe's Theory emphasized development in another way stating that a child moves toward or away from interpersonal activity in early childhood. Roe developed an occupational classification system which some of Osipow's research data refutes.

John Holland postulated six types of individuals: the realistic, the investigative, the social, the conventional, the enterprising, and the artistic.

Osipow points out that it is important that factors lying outside the individual be taken into consideration such as social class membership, sex, race, sometimes finances, the state of the economy, and where a person lives. All of these social systems are brought to bear in career development.

Super often discusses the vital importance of the Self Concept and lists suggested vocational development tasks:

Preschool Child

1. Increasing ability for self-help.
2. Identification with like-sexed parent.
3. Increasing ability for self-direction.

Elementary School Child

1. Ability to undertake cooperative enterprises.
2. Choice of activities suited to ones' abilities.
3. Assumption of responsibility for one's acts.
4. Performance of chores around the house.

CONCLUSIONS:

The Career Development staff has chosen to use Super's Theory chiefly as a basis for planning since Self Awareness plays a large part in curriculum. We feel this concept is important for elementary children.

It would seem that the vocational developmental tasks of Super are reasonable ones. It also, appears to some of our Watertown principals and to the curriculum specialist that ages 9 and 10, about the fifth school year, students vary as to a Fantasy Stage and/or a Beginning Interest Stage. Because of mental maturity, some children in the chronological age of ten, may be displaying more interest orientation than fantasy thinking.

Curriculum workshop people have identified the years K-4 as a Fantasy Period and the sixth school year as being more of a "Growth-Interest Period". Noting Ginzburg's statement that the "fantasy period" changes to a "tentative period" near age 11 years, we have identified the fifth school year as being a "Growth-Fantasy + Beginning Interest" period.

One might note that Ginzburg and Super's Fantasy periods seem to cover about the same chronological ages of children.

We would agree with Osipow that "programming of career education should not be too rigid or too tightly conceived, that new ideas of career education recognize the developmental nature of careers, that changes occur with growth and maturity, and that attitudes are continually being formed toward making educational and vocational decisions."

## CLUSTERS

Watertown, South Dakota schools use twelve elementary curriculum clusters to allow a practicable application if the core approach is used in the reorganization plans of the junior high school.

Agribusiness
Communicative Arts
Consumer and Homemaker
Construction
Financial and Business
Health Occupations
Hospitality and Recreation
Manufacturing
Natural Resources and Environment
Personal Service
Public Service
Transportation

Watertown examples of occupations are shown here for each cluster. This is not to imply exclusion of occupations outside of Watertown. It is merely organized in this manner for the sake of references and easy understanding.

## CLUSTER EXAMPLES

### AGRIBUSINESS

1) Livestock Feeder
2) Dairy Farmer
3) Veterinarian
4) Poultry Processor
5) Hatchery Manager
6) Seed Processor
7) Feed Processor
8) Government Agent
9) Implement Dealer
10) Farm Management Specialist
11) Farm Products Manufacturer
12) Farm Insurance Agent

### COMMUNICATIVE ARTS

1) Radio Announcing
2) Journalism
3) Newspaper Advertising
4) Printing
5) TV Production
6) Freelance Journalism
7) Sign Design
8) Library Science
9) Music Instruction
10) Music Merchandising
11) Artist or Ballet
12) Drama
13) Computer Science

### CONSUMER & HOMEMAKER

1) Food Service Manager
2) Dietician
3) Drycleaner
4) Clothing Store Manager
5) Fabric Store Manager
6) Interior Decorator
7) Upholsterer
8) Flower Shop Manager
9) Landscape Architect
10) Extension Agent
11) Butcher
12) Supermarket Manager

### CONSTRUCTION

1) General Contractor
2) Architect
3) Draftsman
4) Carpenter
5) Electrician
6) Heating & Colling Contractor
7) Landscape Architect
8) Building Products Wholesaler
9) Plumbing & Heating Wholesaler
10) Glass Contractor
11) Cement Products Manufacturer
12) Realtor

CLUSTER EXAMPLES (continued)

FINANCIAL & BUSINESS SERVICES

1) General Banking Services
2) Trusts
3) Banking Loans
4) Credit Bureau
5) Insurance Co.
6) Accountant
7) Insurance Agency
8) Realtor
9) Office Machines
10) Commercial Loan Office
11) Commercial Property Management
12) Chamber of Commerce

HOSPITALITY & RECREATION

1) Game, Fish & Parks Department
2) City Recreation Director
3) Sporting Goods Manager
4) Movie Theater Manager
5) Nightclub Manager
6) Bowling Alley Manager
7) Athletic Director
8) Boy Scouts-Girl Scouts
9) Travel Agent
10) Motel Operator
11) Sports Editor
12) Flight Instructor

NATURAL RESOURCES

1) Weather Bureau Representative
2) Conifer Nursery
3) Game, Fish & Parks Department
4) Soil Conservation Service
5) County Extension Office
6) Sanitation Department
7) Water Purification Department
8) Bureau of Reclamation
9) Sand & Gravel Company
10) Lumber Yard
11) Fish Hatchery
12) Army Corps of Engineers

HEALTH OCCUPATIONS

1) Hospital Administrator
2) Nurse
3) X-Ray Technician
4) Physical Therapist
5) Physician
6) Mental Health Administrator
7) Nursing Home Administrator
8) Dentist
9) Dental Assistant
10) Optometrist
11) Optician
12) Dental Lab Technician

MANUFACTURING

1) Quadee (Rubber Product Co.)
2) Midtex (Electronics Parts Co.)
3) Monument Works
4) Chickasha (Mobile Homes)
5) Schweigers or Pepsi Bottling Co.
6) Concrete Products Co.
7) Woodworking Co.
8) Poultry Processors
9) Sign Manufacturing Co.

PUBLIC SERVICE

1) Model Rural Development
2) City Government Administration
3) County Government Services
4) Law Enforcement
5) Fire Protection
6) Municipal Utilities
7) Post Office & Civil Service
8) Employment Services
9) Welfare Office
10) State Government Services
11) School Administration
12) Lawyer

CLUSTER EXAMPLES (continued)

TRANSPORTATION

1) Airline Representative
2) Motor Freight Representative
3) Auto Mechanic
4) Diesel
5) Auto Parts Person
6) Auto Sales Person
7) Oil Pipeline Representative
8) Railroad Representative
9) Highway Department Representative
10) F. A. A. Representative
11) Bus Company Representative
12) Post Office or United Parcel Service Representative

PERSONAL SERVICE

1) Barber
2) Cosmetologist
3) Radio-TV Repairman
4) Watch Repair Person
5) Mortician
6) Child Care Specialist
7) Tailor
8) Gardener
9) Tax Consultant
10) Carpet Cleaning Specialist
11) Furniture Repair Person
12) Taxi-Driver
13) Public Stenographer
14) Pet Shop
15) Appliance Repair Person

## OVERVIEW

The main divisions of this lesson guide are the eight levels of awareness which lead to life-time targets.

### CAREER DEVELOPMENT

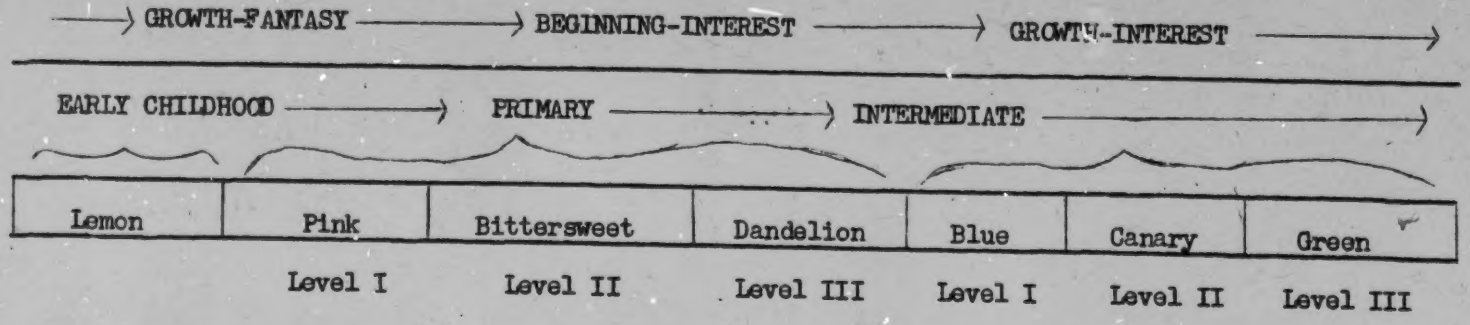
| Objectives | Leading to | Life-Time Targets |
|---|---|---|
| Self Awareness | | Self Identity |
| Career Awareness | | Career Identity |
| Economic Awareness | | Economic Understanding |
| Beginning Competency | | Employable Skills |
| Appreciation-Attitudes | | Social Self Fulfillment |
| Decision Making | | Career Decisions |
| Education Awareness | | Education Identity |
| Employability | | Career Placement |

Within each category, the guide is divided into developmental stages as delineated by Donald Super, vocational authority. Inasmuch as the Watertown philosophy in theory and practice is based upon belief in Individualizing Instruction, we have organized these programs into units with suggested appropriateness for early childhood (kindergarten), primary level (Grades 1-3), and intermediate (Grades 4-6).

This leaves an assignment of levels to the discretion of non-graded teachers as their school needs dictate. Career Development Goals as designed for the Watertown Project appear in their entirety after each level of awareness. They are accompanied by instructional objectives and other criteria basic to an excellent lesson.

Each developmental stage is color-coded corresponding roughly to traditional grade levels to provide guidance to the teacher in determining appropriateness for pupils at various stages. The diagram on page xiii shows in graphic form the progression of Developmental Stages, traditional elementary school levels, and the corresponding color code.

DEVELOPMENTAL STAGE CONTINUUM



CAREER DEVELOPMENT

BEGINNING COMPETENCY

RATIONALE

Beginning competency is a prime and necessary objective of career education and will lead to a life-time target of employable skills.

* Beginning competency implies a beginning understanding of work skills and behaviors adapted for performance in job related tasks.

* Employable skills implies a given skill or skills which the worker possesses that are needed in an interdependent society.

GOALS

In working with the objective of beginning competency, the teacher should adopt these goals in the form of concepts and generalizations developed within the instructional design.

* Leisure time activities affect career choice (hobbies, etc.).

* Activities related to education lead to beginning competencies in many areas.

* "Hands on" activities such as experiments and demonstrations which children become a part of as well as can view.

* Concrete/abstract teaching which will demonstrate in real life many of these activities.

* The objectives of a task, the specific resources required, the outline of procedures, the performing of operations, and the evaluating of products should be beginning competency understandings developed by students as they are exposed to job information.

* Identification and use of basic tools, equipment, and materials associated with business, commercial, and industrial activities should be a part of a students' understanding of beginning competencies.

* An understanding of interpersonal relationships resulting from interaction of people in various occupational roles needed to be achieved by students.

* Educational and occupational competency is needed by students before they move to another preparation stage or enter an occupation in a career area.

* A student needs to develop skills necessary for employment in the career of his choice.

BEGINNING COMPETENCY


| TITLES | INTEGRATION | CLUSTER | PAGE NOS. |
|---|---|---|---|
| DEVELOPMENTAL STAGE: GROWTH-FANTASY-INTEREST | | | |
| EARLY CHILDHOOD THROUGH UPPER INTERMEDIATE | | | |
| Carpentry for Children | Art & Misc. | Construction | 1 |
| DEVELOPMENTAL STAGE: GROWTH-FANTASY | | | |
| EARLY CHILDHOOD | | | |
| Discovering Apples | M, LA: A | Agri-business | 2 |
| (The) Story of Stone Soup | M | Consumer & Homemaker | 3 |
| PRIMARY Level I | | | |
| Paint a Dress | A | Manufacturing | 5 |
| Food Contain Measured Ingredients | SS | Consumer & Homemaker | 6 |
| Wheels That Help Us Work | LA; R | Construction | 8 |
| Level II | | | |
| Making Rock Critters | S; A | Consumer & Homemaker | 9 |
| Puppet Clothing Factory | A, M; LA | Manufacturing | 11 |
| To Sew, The Simple Way to Learn to Sew | A | Consumer & Homemaker | 13 |
| Level III | | | |
| Simple Machines Unit | S | Construction | 14 |
| (a) Supplement to Simple Machines Unit | S | Construction | 27 |
| Career Education Assists in Teaching Maps & Globes | R, W, A; SS | Public Service | 28 |
| Electricity | S | Natural Resources & Environment | 30 |

BEGINNING COMPETENCY


| TITLES | INTEGRATION | CLUSTER | PAGE NOS. |
|---|---|---|---|
| **DEVELOPMENTAL STAGE: GROWTH-FANTASY** | | | |
| **INTERMEDIATE Level I** | | | |
| Advanced Electricity & Magnetism Unit | S | Natural Resources & Environment, & Manfacturing | 46 |
| Electrical Workers in the World of Work | S | Natural Resoucres & Environment | 59 |
| Design to Teach Correct Use, Manner, and Appreciation of the Telephone | LA | Communicative Arts | 61 |
| **DEVELOPMENTAL STAGE: GROWTH-FANTASY-BEGINNING INTEREST** | | | |
| **INTERMEDIATE Level II** | | | |
| Assembling a Newspaper | LA | Communicative Arts | 63 |
| Simulating Weather Forecasting | S | Natural Resoucres & Environment | 64 |
| (The) Work of a Draftsman | SS | Construction | 65 |
| **DEVELOPMENTAL STAGE: GROWTH-INTEREST** | | | |
| **INTERMEDIATE Level III** | | | |
| Building a City | S, LA, SS; Art | Construction; Consumer & Homemaker | 67 |
| Discovering Motion | S | Natural Resources & Environment | 70 |
| (A) Manufacturing Unit | S | Manufacturing | 71 |
| Manufacturing | S, SS, M | Manufacturing | 87 |
| Simulating Manufacturing | S, SS, M | Manufacturing | 89 |
| Rocks, a Career Education Unit to Encourage a Hobby Collection | S | Natural Resources & Environment | 91 |

# CARPENTRY FOR CHILDREN
Construction Cluster

Grades: All Primary & Intermediate  Awareness: Beginning Competency

Subjects: Art; Misc. subjects which might be enhanced by making the wood products.

REFERENCES:

"Carpentry for Children"; Jerome E. Leavitt, 1959 & 1970 9th printing Sterling Publishing Company, 419 Park Avenue, N.Y.

INSTRUCTIONAL OBJECTIVES:

Given materials and tools to make articles selected from 15 different objects, students will be able to perform the necessary work tasks to produce the project selected.

INPUT:

Procedure:

With the assistance of the teacher, the children will study "Steps in Squaring a Block of Wood" and "Steps in Wood Finishing." They will be given the opportunity to do these things in small groups with supervision.

When these steps have been learned, the students are ready to select 1 of the 15 items to make. They should, before doing anything, be familiar with all of the simple tools and with safety rules for handling them. The objects should be relevant to their course of study.

OUTPUT:

The objects should be relevant to their course of study. The children will produce these various objects throughout the year. Example, if a study of Fulton's steamboat is being made, a steamboat could be produced.

Objects could be painted and sold.

EVALUATION:

Level of Performance:

Children will demonstrate;

* an ability to produce an object
* an ability to sell goods and handle money

They will be able to tell;

* if they feel good about doing work like this
* if they feel badly about doing work like this

BEGINNING COMPETENCY

EARLY CHILDHOOD

# DISCOVERING APPLES
## Agribusiness Cluster

Early Childhood — Awareness: Beginning Competencies; Career

Subjects: Math, Language Arts, Art

Piloted by: Betty Burghardt

REFERENCES:

Johnny Appleseed
Apple orchard, pan, hot plate, spices and knives

INSTRUCTIONAL OBJECTIVES:

Given a trip to an apple orchard, the children will realize apples grow on trees, their color is red, their shape is round. They learn to cut an apple into ½'s and ¼'s.

INPUT:

* Take a field trip to an apple orchard and have each child distinguish a good apple from a bad apple.

* Meet the orchardist. Have him show children the items he works with; pruners, special ladders-sprayers, etc. Have him tell about watering apples.

Procedure:

Each child is to cut an apple into ½'s and then ¼'s--put it back to make a whole and then eat it.

OUTPUT:

* Same as above

* Make: apple cider
  applesauce
  apple pies

* Paint an apple tree

* Plant apple seeds

EVALUATION:

Level of Performance:

An appreciation of the apple, its shape, color, and flavor... where it grows, and all things we eat that have apples in them. Will be demonstrated by recognition of apples in a raw or cooked form.



ADDITIONAL COMMENTS:

An excellent fall activity especially at the beginning of the year. Plan a whole week of activities around the apple. "This week we are celebrating" chart: 1. the color red, 2. the round shape, 3. apples

# THE STORY OF STONE SOUP AND BEGINNING COMPETENCIES
Consumer & Homemaking

Early Childhood

Awareness: Beginning Competencies, Career Awareness

Subjects: Math

Piloted by: Betty Burghardt

REFERENCES:

Marcie Brown--Stone Soup Senses
Book, pot, stones, soup laddle, bowls and spoons, soupbone, water, vegetables and pockets full.

INSTRUCTIONAL OBJECTIVES:

After having read the story of STONE SOUP and being exposed to an understanding of the spirit of giving, the children will be held responsible for bringing something in their pocket to contribute to the "pocket" soup.

INPUT:

* Read the story of Stone Soup, The First Thanksgiving, and then discuss what makes up a banquet feast and things we are thankful for.

* Push tables together to form one long banquet table--roll long strips of white paper and mark off a place for each child to decorate for his placemat.

Procedure:

Each child will be responsible for being able to chop, cut, or use whatever they brought in their pocket.

OUTPUT:

* Cut their pocket goods.

* Make a pinecone turkey for their place setting at the table and decorate the placemat at the banquet table.

Level of Performance:

Child should be "thinking" when doing all of these tasks because time is an important element. Hopefully, this will carry over an appreciation of all the work that goes into a meal, for the mother's work or even for a restaurant.

ADDITIONAL COMMENTS:

Recipe:

1 large soupbone
several quarts of water (4)

ADDITIONAL COMMENTS: (continued)

Simmer in water for two hours at least with bone, then add vegetables for 35-45 minutes; anything the children bring is fine:

| | |
|---|---|
| carrots | tomatoes |
| cabbage | onion |
| celery | peas |
| corn | lettuce |
| beans | |

BEGINNING COMPETENCY

PRIMARY
Level I

# PAINT A DRESS
## Manufacturing Cluster

Primary

Awareness: Beginning Competency

Subject: Art

Piloted by: Doris Gearman

REFERENCES:

Waterproof color markers
1 cup salt
soap
dress material

INSTRUCTIONAL OBJECTIVES:

Given instruction and demonstration during a period of at least a school week, the primary students will decorate a dress with paint.

INPUT:

The teacher will:

* buy suitable material,perferably white and a close weave.
* make the dress of a simple pattern style.
* measure the dress and know the number of square inches so that each child will have about the same size area to paint.
* make a cardboard frame to pin on the dress onto a thickness of newspapers.

OUTPUT:

The children will take turns painting with waterproof magic markers any design they choose to draw.

The dress will then be soaked in a salt solution to set the ink, using 1 cup of salt to enough water to cover the dress. Let soak for one hour. Then wash with a mild soap and lukewarm water. Dry and press-ready to wear.

EVALUATION:

Level of Performance:

Involvement and interest on the part of the students are the performance criteria.

# FOODS CONTAIN MEASURED INGREDIENTS

Consumer & Homemaker Cluster

Primary

Awareness: Beginning Competency

Subject: Social Studies

Piloted by: LaVonne Nicholas and Willa Woodward

INSTRUCTIONAL OBJECTIVES:

Given pictures of various types of foods, the children will tell about the products that were needed to make them, and where these products came from. The children will describe the people needed to make these products available to others. The children will demonstrate their understanding of measurement and why it is important to know how to measure, by measuring quantities of ingredients. The children and the teacher will make muffins.

INPUT:

Procedure:

* Teacher displays food pictures. Children decide some of the ingredients of the foods. She helps children think about the workers who were necessary to making this product. Children individually select the pictures they would like the class to tell about.

* Have on display, cooking utensils, a sample of flour, sugar, salt, and other usual ingredients of baked goods such as milk and butter. Only small samples necessary. Let children taste what they would like to taste. Have enough individual spoons available.

* Class can be in a large group for the discussion. Children can relate the foods talked about to the foods that they have eaten. Have recipes ready with ingredients listed.

* Make charts of favorite food recipes. (Keep simple.)

* Show children muffin chart recipe.

OUTPUT:

When ready for muffin making, children will move to table in front of room so that all can see and help. Children read the recipe from the chart and keep referring to it while the muffins are being made. Every child will get a chance to help. Some measure the milk, flour, sugar, etc.. Others crack the eggs, sift the dry ingredients, stir and add liquids. Each child has a chance to fill his own muffin cup with the muffin batter.

EVALUATION:

Outcomes:

* Children will be able to tell some of the ingredients in muffins.

EVALUATION: (continued)

* They will demonstrate how to use measuring cups and spoons and will be aware of the need to measure ingredients accurately.

ADDITIONAL COMMENTS:

Children will enjoy the experience very much and will, also, enjoy an experience of making butter. They are very anxious to share what they are doing with their parents and family. Make the butter first and they will be able to butter their muffin and eat it after they have had a part in making the butter. Butter recipe:

Shake sour cream in a quart jar, add salt, use wooden ladel in wooden bowl to separate milk. (It is most effective when children sit in a circle on the floor for butter making.)

# WHEELS THAT HELP US WORK
## Construction Cluster

Primary

Awareness: Beginning Competency

Subjects: Language; Reading (Library period) Readiness
Likenesses and Differences

REFERENCES:

Oral language
Reading Readiness
"Hey! Let's Go"; Joan Potter Elwart, Western Publ. Co., Whitman Publ. Co.

INSTRUCTIONAL OBJECTIVES:

Given the need to become aware of mechanical equipment and its function in everyday work life, the children will be able to point out usages of the basic wheel with at least 75% accuracy.

INPUT:

* The teacher will assemble a bulletin board demonstrating many wheels, as shown in pictures in the book.

* As the teacher shares the book orally, children find the wheels on the bulletin board as they are called on. (3 D wheels might be used.)

OUTPUT:

* Children will bring toy cars and trucks to school which have different kinds of wheels and will tell the class about the different kinds of wheels. They will tell about the sizes and designs and the special work uses for which these wheels were designed.

* After the first lesson, the student will know that he can refer to the bulletin board and the book for wheels that are like the wheels depicted.

EVALUATION:

Outcome:

Children will be able to be accurate--from 75-90% of the time--in identification of wheels, their sizes and designs.

BEGINNING COMPETENCY

PRIMARY
Level II

# MAKING ROCK CRITTERS
Consumer & Homemaker Cluster

Primary Awareness: Beginning Competency

Subjects: Science, Art

REFERENCES:

Ranger Rick Nature Magazine

INSTRUCTIONAL OBJECTIVE:

Given several flat rocks of various sizes the child will be able to create a rock critter.

INPUT:

Procedure:

How to talk with children: Do you know what a Rock Critter is? What is a Critter? "Rocks can be made into Rock Critters. This has become a Hobby of many people. Rock Critters are not real life animals. They are make believe animals of rocks, and you can make them. We are going to take the rock which you have found. You are going to use your imagination to create a rock critter. These can be lopsided frogs, flat turtles, crossed owls or whatever you want to create." Demonstrate--have some animal pictures around the room of animals children can copy.

The teacher will:

* ask those who enjoyed it "if they think it would make a good hobby and why?"
* see if the children understand what a "hobby" is.
* talk about other hobbies and the satisfactions of other hobbies.
* ask what do hobbies help people do?
  Answer: Express their own interests and express themselves.
* share the rock critters and decide with the group how they could set up a novelty shop selling critters. Where they would advertise? How much they would charge for the critters?
* make room in the corner for a shop?
* send out advertising to the other rooms. Tell children in the advertisments how much these will sell for.

OUTPUT:

* Individual creative ideas of each child are acceptable. Use these as a paper weight or a knick knack.

OUTPUT: (continued)

* Be sure that you use flat rocks (small ones for eyes, nose, feet, ears. Use epoxy glue which teacher or aproned children prepare. Let stand overnight--spray with plastic covering.

* Each child at his desk will:

  Glue rocks together. Let set overnight and paint.
  Spray with plastic clear spray.
  Add felt to the bottom.

EVALUATION:

Outcome:

Children should be able to create a minimum of one animal-looking "critter" from rocks and paint.

# PUPPET CLOTHING FACTORY
## Manufacturing Cluster

Primary

Awareness: Beginning Competency

Subjects: Art, Math, Language Arts

Piloted by: Karen Goebel

REFERENCES:

wall paper paste, newspaper-for puppet heads, paint, brushes
Encyclopedia clothing
Let's Go to a Clothing Factory, Lazarous, Harry; Putnam Pub. Co.. Chicago, Ill.
chart paper, scissors, electric scissors, tables, pencil, paper, tissue paper, chalk, pins, masking tape, needles, thread (optional; real machine), box for packing

INSTRUCTIONAL OBJECTIVES:

Given a simulation of a puppet clothing factory, primary children will be able to tell how an assembly line in a factory works.

INPUT:

* The teacher will assist each student in the making of a paper mache' head formed around a balloon fastened on a pop bottle. Facial features will be either formed from paper mache' or painted on.

* The teacher will help with the proper placement of eyes, ears, nose, mouth.

* Heads will serve for the attaching of the clothing made in the factory.

Procedure:

Teacher will be the foreman and will give orientation to each job before the factory opens. This will help production go smoothly and efficiently. Children will know that they should do very good work as the finished costumes will go on sale at a puppet clothing store and will be purchased with money they receive for manufacturing the garments.

OUTPUT:

* After reading from an encyclopedia and from books about clothing factories, students will set up their own puppet clothing factory. They will bring scraps of material from home.

* Different factory positions will be listed, the materials needed to do the work will be planned, and a job description of the occupation of each worker will also be planned.

* After making applications in written form in a language class by completing a simple application form, students will be selected for the work.

OUTPUT: (continued)

* The next step is to form the assembly line and do the work.

* The jobs planned for one class were:

Designer; draw styles and make patterns
Spreaders; stalk and cut the material even in size
Sorters; put on joker tags placing two pieces together correctly
Markers; use pencil or chalk to trace around pattern on material
Cutters; cut out pieces
Pinners; pin together garment to be sewed
Machinist; sew the garment
Checkers; remove pins and turn inside out
Shipper & Packager; package and ship
More may be added depending on class decision.

EVALUATION:

Outcome:

Students will be able to tell that in the assembly line each person has a job to do which contributes to the production of the completed product.

# TO SEW, THE SIMPLE WAY TO LEARN

Consumer & Homemaker Cluster

Primary Awareness: Beginning Competency

REFERENCES: To Sew Patterns and Learn To Sew Manuals

INPUT:

* Using the patterns of a rabbit, octopus, elephant, bear, the children will select the one they wish to make, and the teacher will teach them to sew simple items.

* The teacher will assemble the following materials needed in addition to the pattern:

  1/2 yd. 45" wide fabric for body
  4" x 5" felt
  4 ea. (" x 12" pieces of felt for ears, teeth, finger, toes, eyes
  embroidery floss.
  cotton thread and polyester fiberfill stuffing

OUTPUT:

"Hands on" activities... which children become a part of as well as can view, are activities related to beginning competency.

Beginning competency understandings, as developed by the student exposed to job information, should be, the objectives of a task, the specific resources required, the outline of procedures, the performing of operations, and the evaluating of products.

EVALUATION:

Level of Performance:

Level I: Objects will be sewn with consistent seams and neat stitches and will be recognizable as representing animals.

Level II: Objects may have some ragged seams and stitches may be uneven, but still hold object together. Animals are representative.

Level III: Sewing is poor; stitches are missing and/or loose; animals may not be recognized

ADDITIONAL COMMENTS:

This will be governed by children's manual ability, and should help to develop small muscles in their motor coordination.

BEGINNING COMPETENCY

PRIMARY
Level III

# A SIMPLE MACHINES UNIT
## Construction Cluster

Primary

Awareness: Beginning Competency

Subject: Science

Piloted by: Kathy Cahoy, Cynthia Barber

REFERENCES:

Science for Here & Now, Heath, 1965

INSTRUCTIONAL OBJECTIVES:

Given a simple machines unit for Science study, the students will demonstrate increased ability and understanding in the areas of attitudes, habits, and skills.

INPUT:

The teacher will teach using the unit procedure as a basis for instruction.

OUTPUT:

Students will pursue activities of the unit.

EVALUATION:

Outcome:

Randomly selected children will demonstrate increased knowledge in the area of attitudes, habits, and skills on a recorded pre-test and post-test of individual thinking, responding to the following questions:

* What do you think are some good work habits?

* How do we show good work attitudes to others?

* How can one: locate information from books?
get additional information?
be a good listener?
take part in discussion?
make decisions?
decide what is good, and what is not good information?
appreciate what workers can do with simple machines?
use reading, writing, math, in a career?

# HABITS, ATTITUDES, AND SKILLS

## Habits

1. To learn to follow directions.
2. To learn to accept responsibility and carry it out.
3. To learn to be courteous.
4. To learn to become dependable.
5. To develop good work habits.
6. To learn to become an independent worker.
7. To encourage the children to work in groups.
8. To cooperate with each other and the teacher.
9. To develop some skill in doing experiments independently.
10. To develop a basic background of facts.
11. To anticipate change and plan ahead.

## Attitudes

1. To develop an appreciation for science as it affects us in the world today.
2. To appreciate the contributions of others.
3. To make and follow rules set up by the class.
4. To have a willingness and desire to improve oneself.
5. To develop intellectual curiosity.
6. To develop a good self concept.
7. To respect the feelings of others.
8. To discover the importance of cooperative work.
9. To appreciate and enjoy people.

## Skills

The children will be able to:

1. Locate information.
2. Reason through complex problems.

Skills, continued

3. Obtain information from other sources.
4. Evaluate.
5. Develop critical thinking.
6. Acquire study skills.
7. Become better listeners.
8. Participate in good discussion.
9. Draw conclusions.
10. Appreciate what people do with simple machines to help each other. (Interdependence of people.)
11. To emphasize the tie between basic skills and the career.

## BASIC KNOWLEDGE

1. There are six simple machines to help man.
2. Simple machines help us to do work easier and faster.
3. Some simple machines are large, some are small.
4. Many simple machines can be operated by muscle power.
5. We use simple machines every day.
6. Simple machines are used in all careers. (In this unit carpenters will be stressed.)
7. The tasks that carpenters do to perform their work involves many types of simple machines.
8. Carpenters need certain basic skills to perform their work. (These basic skills can be learned in school.)
9. Carpenters provide a service.

## TEACHER STRATEGIES

1. The children will do problem solving.
2. Field trips will be taken.
3. The children will do role playing.
4. The children will help to make the bulletin board.
5. The children will be able to experiment with real objects.
6. The children's love of fantasy in imagining themselves involved in the activity will be captured.
7. The children will learn by doing the actual experiences and getting themselves involved in the activity.
8. The children will learn the rules concerning the safe handling and use of the tools.

## BULLETIN BOARD

The only thing on the bulletin board when this unit is begun should be a large picture of a carpenter. As each of the simple machines is studied, something new will be added to our bulletin board concerning this type of machine. Upon completion of the unit, all the types of simple machines will be displayed.

Bulletin Board, Continued

A table of all the tools, labeled and divided as to the type of simple machine each is, will be kept. Experiments will be left up after being done as a class. (The children may come up with new ideas and experiments on their own.)

INTRODUCTION

This unit will be introduced by giving a pre-test. Children will be seated in a semi-circle. An informal discussion will be taped. Begin by asking a child to move the teacher's desk. This will be difficult for him to do. We will have two pair of skates and will try putting a skate under each leg and then see if it moves easier this way. We will try any ideas that the children have. We will discuss which ways were easier and some reasons why this is so. We will discuss different things which were used that make work easier for us.

We will read the book: "I Want to Be a Carpenter". We will discuss some of the different tools that he used. Students will draw a picture of some tool that the carpenter uses.

A field trip to a construction site will be taken, where a house is being built. Different types of tools used to make a carpenter's work easier will be observed. Comparisons will be made of the things we read in the book to things we saw.

Content

* What is a machine?

  A tool which, by applying a force:
  makes work easier.
  changes direction of the force.
  increases the speed.
  makes work easier.

Learning Experiences

* Read page 19 in our text

* Read the poem, "Hall's Houses"

ROLLERS

Content

* Rolling friction resists motion less than sliding friction

* Opposing force is smaller; therefore, less work is done.

* Need to keep picking up and putting rollers in front of load.

Learning Experiences

* Read pages 20 and 21 in our text

* Experiment: have a child lift a pile of books. Then tie a string around the books and pull it along the desk. Now we will put pencils under the books and pull them. We will discuss which way was easier and why.

* Experiment: We will put a pile of salt on a desk and pull a can through this. Then we will roll the can over the salt.

* Throughout this unit we will make a chart of all the machines and an experiment that we did for each one. We will start our chart now with a picture and a short write-up.

*

WHEELS

Content

* Most important machine.

* A wheel is not a machine until it is combined with another wheel or axle.

* Ballbearing wheel has less friction than a plain wheel, therefore, it is better for speedy things.

* Ballbearing wheels have this name because they have the weight on the ring of balls.

WHEELS, continued

Learning Experiences

* Show the filmstrip: "Wheels and Axles".
* Show a transparency of wheels and axles.
* Look at some examples of wheels and axles that I have brought ( eggbeater, bike, doorknob, pencil sharpner, etc.).
* Read page 22 of our text.
* All of the students will make a simple wheel by cutting a circle out of paper and then put a pencil through the center. We will see that the circle will not spin long because of the friction.
* Experiment: We will try to spin something heavy. Now we will put marbles on the floor and put a lid over these. We will set the heavy object on the lid and then try to spin it. We will discuss how this wheel is different from the plain wheel we just made.
* I will make two wheels out of cardboard and fasten them to a big piece of cardboard. I will place them close enough to show that by moving one wheel the second will turn. We will discuss different machines that have two wheels that work this way.
* The students will draw a picture of some machine they use that has wheels.
* We will add another picture to our chart.

## INCLINED PLANE

Content

* It is a flat surface with one end higher than the other.
* It makes work easier because it uses a smaller force to move the object a longer distance.
* The longer the distance, the less force is required.
* Friction on ramps can be reduced by the use of wheels.
* Help raise a body that is too heavy to be lifted straight up.
* It is easier to lift something along a slant than straight up and down.

Learning Experiences

* Show the filmstrip: "Inclined Planes".
* Show a transparency of inclined planes.
* Read pages 23 and 24 in our text.
* Read the poem "Big Question".

INCLINED PLANES, continued

Learning Experiences

* Look at pictures and discuss the different kinds of inclined planes.

* The students will draw a picture of some way that they can use an inclined plane.

* Experiment: Have a pile of books about a foot high. Attach a rubber band to the front of a toy car and let it hang by the rubber band. Then lean a board against the books and pull the car up the board. We will see this does not take as much force because the rubber band does not stretch as much.

* We will add another picture to our chart.

WEDGE

Content

* Is used to overcome resistance.

* Any tool that cuts is a wedge.

* There are many kinds of wedges in nature.

Learning Experiences

* Show the filmstrip: "Wedges".

* Show a transparency of wedges.

* I will have an ax, needle, knife, scissors, etc. for all the children to look at, use, and discuss things about them.

* The children will draw a picture of a wedge. I will ask them to try to think of one that we have not discussed.

* I will have blocks of wood and a nail for each student to pound into the wood.

* We will sing the song, "Pounding a Nail".

* We will add another picture to our chart.

SCREWS

Contents

* They are inclined planes wrapped around a round object.

* They are used to hold things together.

* They are used to lift things.

SCREWS, continued

Learning Experiences

* Show the filmstrip: "Screws".

* Show a transparency about screws.

* I will show them a screw and then put one into a block of wood. We will compare the screw to the nail. We will discuss the different tools that we used for each one to get it into the wood.

* All of the students will make a screw using a piece of paper and two pencils. It will show how a screw is an inclined plane.

* We will read the six short poems: Hammer, Washing Machine, Refrigerator, Water Faucet, Telephone, Needle.

* We will add another picture to our chart.

* A carpenter will come in and show the different kinds of tools they use and give us some demonstrations of how they work.

PULLEY

Content

* Is a special kind of wheel.

* Change direction of motion of an object.
Downward pull will cause an object to go up.
Great advantage.

* Simplest pulley is the gingle fixed.
Attached at the top of the pole.
Only the wheel turns.

* Movable pulley.

Learning Experiences

* Show the filmstrip, "Pulleys".

* Show a transparency of pulleys.

* Read page 25 in our text.

* Show pictures of the two different kinds of pulleys and discuss which kind we would use for a certain kind of job.

* Experiment: We will construct a pulley and then use it to lift many different types of objects. We will make both kinds of pulleys and observe how each operates in lifting an object.

* The children will all draw a picture of some way in which they could use a pulley.

PULLEY, continued

Learning Experiences

* We will draw another picture for our chart.

* I will show the children some pictures of pulleys.

## LEVERS

Contents

* Helps a light thing lift a heavy one.

* The longer the lever the more weight can be lifted with less effort.
  The rest is the fulcrum.
  Side you apply force is effort.
  The opposing side is resistance.

* Sometimes the lever is curved.

* May have two levers together forming a double lever.

Learning Experiences

* Show the filmstrip; "Levers".

* Show a transparency on levers.

* Look at some tools that I have brought that are levers.

* Experiment: Have two glasses of different sizes and a ruler. We will try to find where to put the glasses on the ruler so they will be balanced. We will discuss some different ways that we could do this.

* We will look at scissors, pliers, nutcracker, etc. --all of these are double levers. We will discuss the difference between single and double levers.

* We will add our last picture to our chart. We will discuss what we have on our chart.

* Show the film; "Simple Machines For You". We will discuss all the different kinds of machines that we have studied.

## CULMINATING ACTIVITY

A field trip to the same construction site visited at the beginning of the unit will be taken. Progress made will be observed, discussion on what tools were helpful in doing certain jobs. By this time the children should know about tools and hopefully will ask questions. The foreman may have consented to give demonstrations of the various tools and do some actual work with them for the children. He may also point out how it is important to be able to work with numbers, and read plans, etc..

A post-test in the form of an informal discussion will be taped. During this discussion some of the children will role play careers that use some type of tool.

End with the song: "Pounding a Nail".

MATERIALS USED IN THE UNIT:

Filmstrips

Machines Help Us Work --Levers

Machines Help Us Work -- Wheels and Axles

Machines Help Us Work -- Pulleys

Machines Help Us Work -- Ramps

Machines Help Us Work -- Wedges

Machines Help Us Work -- Screws

The Story of Machines

Simple Machines for You

Transparencies

Machines: Lever

Machines: Inclined Plane

Machines: Wheel and Axle

Machines: Pulley

Songs

Pounding a Nail

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Shay, Arthur, What Happens When You Build a House; Reilly and Lee Books, Chicago: 1970

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## (A) SUPPLEMENT TO A SIMPLE MACHINES UNIT
Construction Cluster

Primary — Awareness: Beginning Competency

Subjects: Science; Social Studies

REFERENCES:

Food Clothing, & Shelter A206 SS--How We Get Our Homes, Society for Vis. Ed. Inc., 1345 Diversey Parkway, Chicago, Ill. 60614
Subsidiary Gen. Precision Instrument A205

| | |
|---|---|
| Planning the Home | Building the Shell of the Home |
| Building the Foundation | Finishing the Home |

INSTRUCTIONAL OBJECTIVES:

Given three visits to a house under construction, students will be able to tell about structural changes they observed, workers; and their clothing and tools. They will be able to tell the tasks which major workers perform.

INPUT:

Procedure:

* The teacher will need to read orally while students share the colored filmstrips as filmstrip vocabulary is somewhat difficult for all ability levels.

* Show the filmstrips and observe how workers use simple machines. Have children observe the different processes which need to be completed before a house is built.

OUTPUT:

* Students will observe the structural changes taking place in a house three different times.

* Occupations of the workers will be discussed by students.

* A good writer and speller may place occupations being discussed on the board for later sharing. (Let children volunteer for this. If they see themselves as a good writer and speller, they will try to play the role successfully.)

* Children will then play the roles of workers performing the different building tasks without talking. Class members guess work being simulated.

EVALUATION:

Outcome:

Children, as a group, should be able to tell five workers who help build houses. They should be able to tell a task of each of the five workers.

## CAREER EDUCATION ASSISTS IN TEACHING MAPS & GLOBES
Public Service Cluster

Primary — Awareness: Beginning Competency, Career Awareness

**Subjects:** Correlate Reading; Writing, Art, Social Studies

**Piloted by:** Janet Stoudt, Grace Kissinger

REFERENCES:

Communities & Their Needs, Silver Burdett
Communities & Social Needs, Laidlaw
You and the Community, Benefic Press, Allyn & Bacon
Filmstrips--Maps and Globes
The Earth Is a Whirling Ball
Supplies for making transparencies and charts
Map Skills--Weekly Reader

INSTRUCTIONAL OBJECTIVES:

Given the opportunity to integrate career education with the teaching of maps and globes, the children will be able to tell the uses of maps and globes and something about the competencies needed by workers associated with them.

INPUT:

* The teacher assembles materials, maps, globes of moon and earth--charts, transparencies needed to stimulate the child's thinking.

* Large group discussion--filmstrips and transparencies used with entire group.

Procedure:

* Children listen while in a semi-circle (if this arrangment is possible). The inquiry method is used in the discussion leading, and children are challenged in this manner.

* Students are then arranged in small groups of 2-4 (no more). They serve as map-makers, surveyors, draftsmen, etc..

* Assembly line concept can be developed from this approach.

OUTPUT:

* Pupils complete bulletin board by making plans, surveying and locating where born on a map. Bulletin Board caption, "In What City Were You Born?"

* Make a salt map.

* Put together a U.S. and World Puzzle.

OUTPUT: (continued)

* Tour the playground, and draw a map using symbols.

* Draw a school room using symbols.

* The group acts as city planners--large city map, place homes, factories, etc. in the proper place.

* Field trip to visit the vocational school drafting department.

* A group of 3 or 4 make a map dictionary. The group find different kinds of maps pointing out 1 to 3 special things about them.

* Children are taught to run filmstrip machine, and explain materials on filmstrips, (group of 2 for each filmstrip).

* They read TRUE BOOK OF MAPS--making transparencies or filmstrips, (groups of 2--1 draws--1 explains).

* Large chart--made up of map (legend or key).

* Write a story, "If I Were a Pirate's Map".

* Write a poem about a map maker.

EVALUATION:

Level of Performance:

Children will demonstrate that over 50% understand maps and globes better when post-tested than when pre-tested, as a result of the special map study.

They will be able to tell about the competency of a variety of map makers.

# ELECTRICITY

Natural Resources & Environment Cluster
Manufacturing Cluster

Primary

Awareness: Beginning Competency

Subjects: Science

Piloted by: Carolyn Oyan

INSTRUCTIONAL OBJECTIVE:

Given an individualized unit in electricity designed for primary, students will team as buddies when necessary, and complete the unit by following the specified directions. They will be able to demonstrate current and static electricity and tell how each kind of current is important to them.

INPUT:

The teacher will assist students in following the unit.

OUTPUT:

Children will work on the completion of the unit using the buddy system to aid readers of lower ability.

EVALUATION:

Outcome:

Students will demonstrate increased knowledge of static and current electricity by being able to perform and explain about an experiment representing each kind of electricity.

They will be able to tell 1 way electricity is important in their life.

## ELECTRICITY IN YOUR LIFE

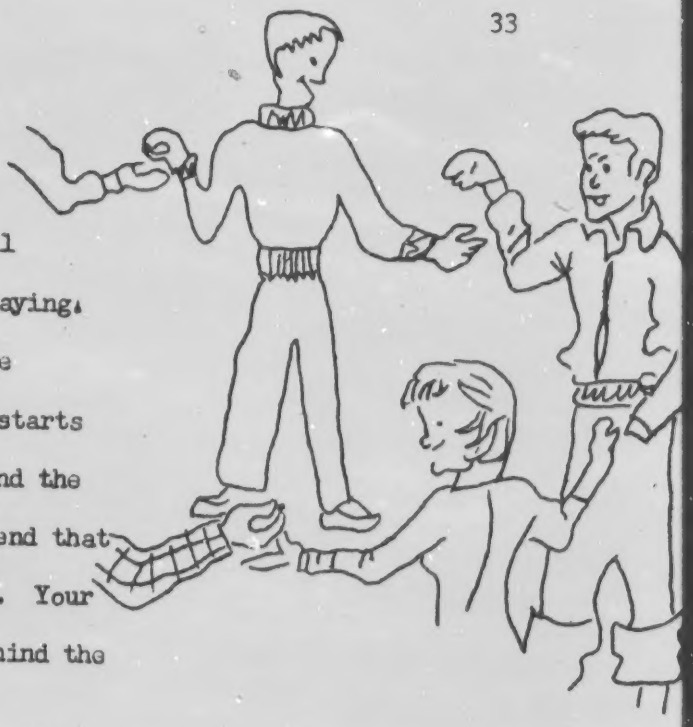
Electricity is everywhere in things around us. It is part of each leaf and stone. It is in the ground we walk on, in the air we breathe, and in the elevator we ride on. Scientists know that all the things we touch and use are really swirling clouds of elctricity, but it took thousands of years to find this out. Only a hundred years ago people thought electricity was something extra that could be added to things or taken away. They did not realize that it was part of ALL materials.

We know that no one can see electricity, just as no one can see the wind! Electricity is like the wind in other ways, too. The wind is a force--a form of energy. So is electricity. Even though we cannot see the wind, we can see what it does. We can see the work electricity does too. It runs motors, lights lamps, and does many other things. We know how to make electricity in great quantities. We know how to measure electricity's strength and how to control it.

The elctricity that hides in every piece of matter does not usually show itself unless YOU do something to bring it out. And now YOU are ready to bring it out!

It is your choice as to which of the activities you want to do first, second, third, etc., but you should do all of the reading. When you have completed the activity, don't forget to circle the dot! ⊙

- Let's read, A Book to Begin on Electricity, by Leslie Waller. Choose one of these founders of electricity. Make a display poster about him. Display it somewhere!
- Pick a partner and take turns naming ways to use electricity at home, school, church, and everywhere in town.
- Let's read the book, Electricity, by Ben Berner. Read the part you thought was most interesting to a friend.
- Make-up a poem about "electricity" to share with the other primary students.
- Read page 173 in your science book. Find how electricity works in this picture!
- On a large piece of construction paper, cut and use magazine and catalogue pictures to make a model of the rooms in YOUR home. Circle, with crayon, everything that works by electricity. The picture on page 51 of The Story of Electricity by Freeman will help.
- Find the word electricity and its meaning in our dictionaries. Make your own "ELECTRICTIONARY". In it you will cursively write all the new words and their meanings you learn, while we study electricity.
- Let's read pages 6 to 9 in The First Book of Electricity, by Sam Epstein. Find the electric motor in your vacuum cleaner and electric mixer.



Read pages 10 and 11 in the book, The First Book of Electricity. Now play the "electricity game". You'll need 4 to 6 players. You need a small box and one raisin for each person playing. One player stands behind the box. The other players stand in a circle that starts and ends at the box. The player behind the box puts his raisin in the box. Pretend that every player in the circle is an atom. Your raisins are electrons. The player behind the box is the starter.

Game rules are:

1. No atom (player) can have more than one electron (raisin) at one time.
2. No atom is allowed to throw away an electron.
3. An atom can only pass electrons on to the next atom or to the box.
4. An atom must never hand an electron back to the atom it came from once things are in motion.

Just before the game begins, every person (atom) in the circle should have one raisin (electron). So has the box.

No electrons are moving! No electricity is being made! Want to make electricity? The starter gives the signal. He takes the electron out of the box and hands it to the atom on his right. Now things are out of balance. The box has no electrons and the first atom has two. He must quickly pass his extra electron to the second atom, who quickly passes his extra electron to the third atom, etc..

The last atom in the circle has only one place to get rid of this extra electron. He puts it into the box. Now everything is back in balance. The starter atom may suddenly take the electron out of the box and start

it going around the circle again. The electrons can move around and around the circle. When electrons travel in the same direction all the time, they produce a kind of electricity we call "direct current" because it always runs in the same direction.

The starter atom does not have to play to the atom on his right. He can pass the electron to the left one time, then to the right next time, then to the left, etc.. When electrons alternate (take turns) like this, they make a kind of electricity called "alternating current". The electricity most of us use in our homes is "alternating current". Remember that if this circle of players (atoms) or this circuit of electricity is broken at any point, the electrons can't get to the starter. They stop moving! There is no electricity!

- Read pages 34 to 42 in The First Book of Electricity, by Epstein. Have your parents help you find your electric motor. Draw the clocks from your electric motor. Write below them the total number of kilowatt hours shown.
- Read, The Story of Electricity, by Mae Freeman. Check the science words on pages 77 and 78. Write a newspaper article just like you think Benjamin Franklin would have written about his discovery. Give it a headline!
- Read all of pages 178 and 179 in your science book. Do the experiment. Then pick a partner and work out the problem at the bottom of page 179.
- Read pages 167 to 171 in Finding Answers Science Book. Make finger puppets for the characters in the story and use any other prop you might need to present this story to the other primary students.
- Read pages 9 and 10 in Learning Why book. Do all that you are told to do and answer the questions, too.

- What is wrong in this picture? Make it correct here!

- Read pages 76, 80 to 83, and 103 in your science book. Make yourself a scrapbook on electricity like Charles stated on page 103.

- Read pages 180 and 181 in your science book. Tell a classmate what each electric motor does.

- Read pages 182 and 183 in your science book. Do the experiment on page 183.

- On page 184 in your science book, tell which pictures are complete circuits and which are incomplete circuits. You may need to reread page 182.

- Try the number 2 experiment at the bottom of page 186 in your science book.

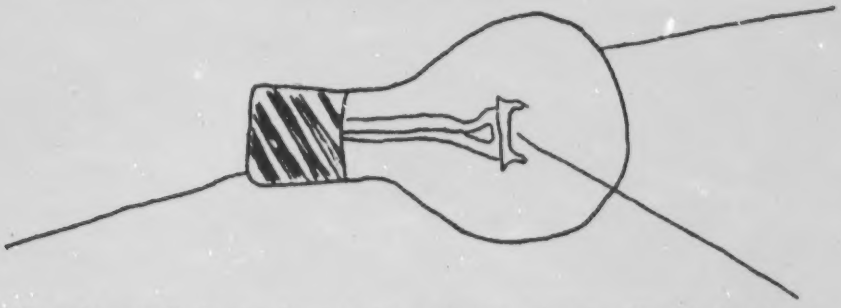
- Go to an electric supply store or to an electrician. Find out what kind of wire is used in light bulb filaments.

- Look at the light bulbs on page 187 of your science book. Do they give off different amounts of light? Start a class display of different kinds of light bulbs.

- Read pages 37 to 43 in The First Book of Electricity. Do the experiment on page 43. With a grown-up, explore the electrical wiring in your home. Find out:

  1. Where do wires from the powerhouse come into your house?
  2. Find the main switch and fuse box.
  3. Look for the cables that go from the fusebox into some room in your house.

- While holding an electric light bulb, read pages 49 and 50 of The First Book of Electricity, by Epstein. Find these parts in the electric light bulb you are holding. Label them here.



- Learn about "magic eye" doors by reading in the book, Electricity in Your Life, chapter XXI, pages 109 and 110. Also, pages 70 to 75 in The Story of Electricity, by Mae Freeman, are about "magic eye" doors. Draw and label a picture showing how these doors work.

- In Electricity book by Parker, read pages 14 and 15. Take a flashlight apart. How does your flashlight work? Find all the parts shown in the diagram on page 15.

## STATIC ELECTRICITY

Sometimes you can hear electricity on top of your own head! Comb your hair on a cool, dry day. You will probably hear a crackling sound. The sound comes from STATIC ELECTRICITY. The word static means something that stays in one place.

This kind of electricity is made by the comb and your hair rubbing together. You may have heard this same crackle if you have stroked your cat or petted your dog on a dry winter day. The electricity comes from rubbing your hand on the fur.

You can see and feel static electricity. Try scuffing your shoes on a wool rug. Then reach out with one finger to a metal doorknob in a dark hallway. Just before you touch the knob, a tiny spark jumps from your finger to the metal. You will feel a small, tingling shock. The flashes of lightning you see in a thunderstorm are static electricity, too.

Would you like to know what makes lightning?

- Read pages 6, 7, and 8 in Junior Science Book of Electricity, by Garrad. Explain to your parents what makes electricity.

You can make static electricity! Try these experiments:

- 1) Put a piece of paper on a table. 2) Rub the paper back and forth with a pencil. 3) Lift one end of the paper and then let go of it. Did the paper snap back to the table? Did you hear a crackling sound? That's static electricity!

- Blow up a balloon. Tie the opening with a piece of string so the air can not escape. Now rub the balloon on a coat or sweater for half a minute. Put the balloon against the wall. Does it stay? If it does, static electricity is what holds it there!

- Cut a piece of tissue paper into small pieces (about the size of a postage stamp). Put them on a table or desk. Now rub your comb with a piece of woolen cloth. Bring the comb near the pieces. Does the comb pick them up?

- Turn on a faucet part way. Rub your comb on woolen cloth. Hold one edge of the comb close to the running water. WATCH! Be careful not to let the comb touch the water (the electricity will leak off if the comb gets wet). Draw a picture of how this experiment looked to you.

- Look up the meaning of "static electricity" in the back of the book, Electricity, by Walker.

- Look in a mirror, comb your hair with a hard rubber comb. Do you hear crackles? Do you look like the pictures on pages 20 and 21 of the book, Electricity in Your Life, by Adler? Draw a picture of your face. You can use the yarn and glue in the room for hair. Can you make the picture look like you looked? Give your picture a title.

- Charge two balloons with static electricity by rubbing them against something wool. Is it easy to bring the balloons together? Show a friend. Does he think they come together easily?

- At home, try the experiment in the book, Electricity, by Parker, on page 6. Make paper dolls dance! You'll need:

  a flat piece of glass
  four books
  silk cloth
  paper dolls

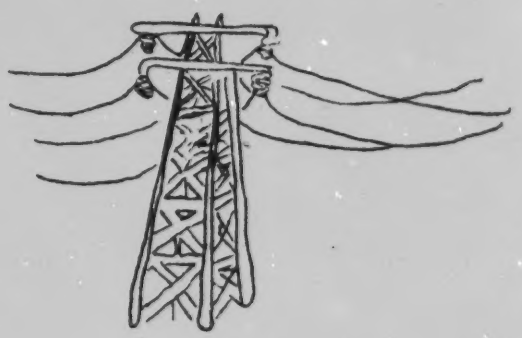
- Cut a little airplane out of aluminum foil. Use a hard rubber comb or rod. Rub the rod with fur. Hold it in the air. Hold the airplane near it. Let go of the airplane. What happens? Write down what happens and hand it in.

# CURRENT ELECTRICITY

We cannot use static electricity to light our houses or run our machines. That is because it won't travel through wires. We learned that the word static means...stays in one place.

The electricity that works for us is called CURRENT ELECTRICITY. This kind may come from a flashlight battery or from a huge power plant.

Wires that carry electricity from power plants to cities many miles away, are called "transmission lines".
Wires on wooden poles carry the electricity from the transmission lines to houses, farms, and factories.
In cities most of the wires are underground. They are protected by concrete pipes.



- In the Junior Science Book of Electricity, by Garrard, read the last paragraph on page 13, all of pages 14 and 15. As you read, examine the broken end of a lamp cord. In this cord, point out the conductor and the insulator to a friend.

- Make a simple battery! You'll need: silver (dimes)
  copper (pennies)
  salt water

  Cut out a half dozen pieces of blotting paper in 2 inch squares. Soak them in the salt water! Lay a dime on the table, put a penny on top of it, then a piece of wet blotting paper on top of the coins. Add another dime, penny, and piece of wet blotting paper. Build until you have five dimes and five pennies. Moisten your first finger on both hands. Pick up the pile and hold between wet fingers. Do you feel a small shock? Check your experiment in the Junior Science Book of Electricity in the last paragraph of page 18.

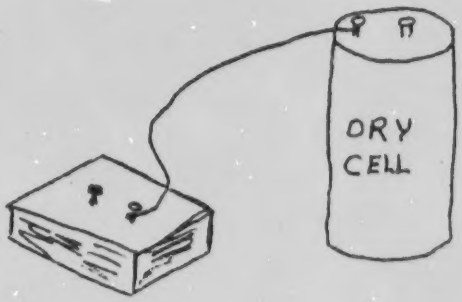
To discover what things conduct (carry) electricity and what things do not, you can experiment with a dry cell battery.

You will need the following things:

A wooden block about six inches square
two flat-head wood screws about 1½ inches long
three feet of insulated bell wire
flashlight bulb and porcelain socket to fit the bulb

Sink screws part way into the block of wood. The tape should be ½ inch apart.

Cut wire about 10 inches long. Scrape off insulation for one inch at both ends. Wind one end tightly around one screw. Be sure only the bare wires touch the screw. Fasten the other end to one of the terminals on a dry cell.




Take another piece of wire about 8 inches long. Scrape off insulation at the ends. Wind one end around the other screw on the block of wood. Wind the other end around the screw in the porcelain socket. Tighten this screw so it holds the wire firmly.

Use the rest of the wire to connect the other dry cell terminal with the second screw of the porcelain socket. Now your equipment should look like this:

Screw the flashlight bulb into the socket. Does the bulb light up? Why not? The wooden block breaks the circuit (circle) of electricity. Therefore, wood is not a good conductor of electricity.

Now put a paper clip on top of the screws. Does the bulb light up? Now you have a complete circuit of electricity. The steel paper clip is a good conductor of electricity.

Get two cardboard boxes. Label one box CONDUCTORS. Label the other box INSULATORS. Test all kinds of things by laying them on the two screws. When the light goes on, you have a CONDUCTOR. Put it in the CONDUCTOR box. If the bulb does not go on, you have an INSULATOR. Put it in the INSULATOR box. Here are some things to test:

| | | |
|---|---|---|
| pencil | key | comb |
| half dollar | stick of gum | scissor |
| dime | nail | tin can |
| nickel | eraser | bottle top |
| paper | ruler | can you think of more? |

- Mount samples of electricity CONDUCTORS and INSULATORS on charts. Be sure to label them.

- Do you wonder how a doorbell rings? Experiment to find out!

You'll need these things: Electric bell
push button
dry cell battery
insulated wire

Hook it up like this:

Press the button.
Does the bell ring?
If so, it is because the circuit of electricity is complete.

- Make your own telegraph set! In Junior Science Book of Electricity, read pages 53 to 59, it will tell you how to do it. In The First Book of Electricity, reading pages 64 to 66 will also help you make your telegraph set.

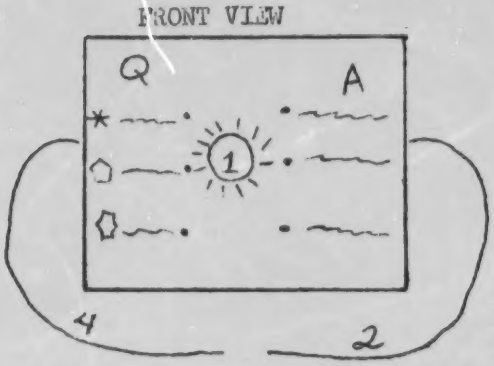
- How does your toaster toast? To find out let's read in The First Book of Electricity on pages 47 and 48. Tonight tell your mother and/or father what you learned today.

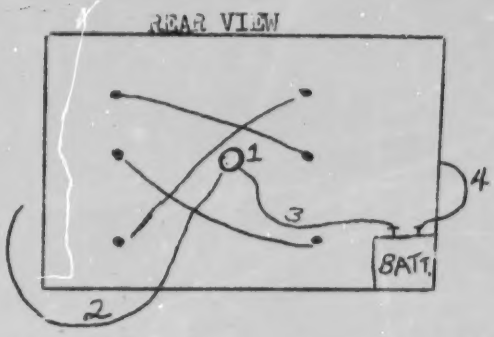
- Make youself an electric questioner like your teacher's.

You'll need:

1. a sturdy shoe box
2. copper paper fasteners
3. insulated copper wire
4. a flashlight bulb
5. a dry cell battery

Each question on the left has an answer on the right. Next to each question and answer is a terminal (copper fastener) which is connected by wire (on the back). If you touch the correct answer, the light goes on.




1. flashlight bulb
2. wire that reaches from bulb to front of board for contact with terminal
3. wire from battery to light bulb
4. wire from battery to front of board to contact with terminal

When one wire is touched to a "question" terminal and the other wire to the correct "answer" terminal, the wire which connects the terminals behind the box completes the circuit and the light goes on!

# SAFETY RULES FOR ELECTRICITY

Electricity is very useful. When you use it carefully, it is your friend. But if you are careless, electricity can harm you! Remember to follow these rules and electricity will work well for you:

1. Never try an experiment with an electrical appliance or an electric cord that is connected to the current at home or school.
2. Never touch an electrical appliance with wet hands. Also be sure not to touch it if any part of your body is touching a water pipe.
3. Never touch electric wires or use an electric cord on which the covering (insulator) is worn.
4. Stay away from broken wires that hang down from poles or buildings.
5. Never climb a pole that supports electric wires.
6. When a fuse "burns out" always put in a new fuse that will carry the same current. If the old fuse is 15A, the new fuse should be 15A.
7. Always turn off the current when you put in a fuse. Otherwise you may get an electric shock.
8. Never try to use a penny instead of a new fuse. The penny is made of copper. It will not melt until the copper wires do, too. The experiment on page 535 of Elementary School Science book proves this rule to be very true!
9. Have any switch repaired at once if you get a shock from it when you use it to turn current on and off.
10. Do not go away and leave an electric iron connected. It may set the ironing board on fire.
11. If you use an electric heating pad, be sure it has a waterproof cover. You may get a shock if perspiration soaks into it.
12. Do not touch the insides of your television set or anything else electrical.
13. Never use a knife, fork, or spoon to get bread out of an electric toaster while it is turned on. You may get a shock or a burn, or you may cause a short circuit.
14. Do not poke anything into electrical wall outlets.
15. Do not stay outdoors in a lightening (electrical) storm.

When paper sticks to your arm and your hair stands on end, it is fine to say static electricity can be a nuisance. However, it can be MORE than a nuisance. You know that lightening is static electricity, yet it can do a great deal of harm. Little sparks can do a great deal of harm also. A rubber hose may get charged when gasoline runs through it. A spark may jump from it and set the gasoline on fire. Should we turn the car off when we fill it up with gasoline? In flour mills a tiny spark may make all the dust that is in the air explode. People who work with anything that will burn easily must always be on their guard against these little lightenings (static electricity).

YOUR CHOICE OF ACTIVITIES:

- Make an illustrated booklet using these Safety with Electricity rules.
- Make a poster showing one or more of these electricity safety rules. Display it at home or school.
- Make up a play showing the do's and do not's you have learned while you studied electricity.

List any other books or magazines you read about electricity:

TEACHERS:

- Invite in an electrician you know or, better still, go out on a site where he is working and watch him connect up wires.
- Arrange to be at a site where telephone construction is going on and see wires being spliced in cables and switchboards.
- Arrange to have radio people show children the emergency power supply at the radio station.
- Talk to people at your municipal power company and find out what things they could show children about their work with wires and electricity. Drive out and see a high voltage transmission line and trace the power to the electric box. Do the same with telephone cable, wires, and house installations.
- Investigate the nomenclature of the workers who are doing house electrical installation and maintenance, and power company workers.
- Have a ham radio enthusiast bring along his "rig" in a car and share some amateur radio with you.

YOU CAN DO MANY THINGS LIKE THE ABOVE, BUT IF YOU CAN ONLY DO ONE THING IT IS DEFINITELY BETTER THAN NOTHING. LOOK OVER THE JOB FAMILIES IN THE TELEPHONE, RADIO, AND MUNICIPAL POWER COMPANYS.

NOW, WHAT IS YOUR EXCITING IDEA?

BEGINNING COMPETENCY

INTERMEDIATE
Level I

# ADVANCED ELECTRICITY & MAGNETISM UNIT

Natural Resources & Environment and
Manufacturing Clusters

Intermediate

Awareness: Beginning Competency

Subject: Science

Piloted by: Mrs. Ann Larson

INSTRUCTIONAL OBJECTIVE:

Given an advanced unit in electricity and magnetism, students will perform experiments individually and with buddies as desired, and will be able to explain their experiment and the principles of electricity and magnetism which it demonstrates.

INPUT:

The teacher will serve as a facilitator of ideas throughout the unit.

OUTPUT:

Students will work as buddies, following through on unit experiments successfully.

EVALUATION:

Outcome:

Children will be able to demonstrate a successful project performed in the progress of the unit.

Can you read and find the answers to the following questions?

1. What is electricity? _____

2. How do you know what electricity is? _____

3. How does electricity get into our homes? _____

4. Where does electricity come from? _____

5. What makes electricity? _____

6. How is the electric current turned on and off? _____

7. Name three things that electricity gives us. _____

_____

8. Is electricity dangerous? _____ How? _____

9. Name some things in which electricity gives heat. _____

_____

10. Name some things in which electricity gives light. _____

_____

11. Can electricity make things move? _____

12. Name some things that can move by electric power. _____

_____

13. How does it make things move? _____

_____

14. Name some uses of electricity for each of these:

In homes _____
In business and industry _____
On farms _____
In communications _____
In transportation _____
In science _____

15. What is a dry cell? _____

_____

16. What are terminals? _____

17. What is the filament in a bulb? _____

18. What electric lights have no filaments, but have gas in them instead?____

_____

19. Do we get more light from a thin wire or a thick wire?_____

20. Read about electromagnets. Find out what they are and how they work. All electric appliances have electromagnets. How many does a door bell have?_____

21. Find out what a complete circuit is and be ready to experiment with one when you complete these questions.

22. What materials will carry electricity?_____

_____

23. What materials do not carry electricity?_____

_____

24. What is insulation?_____

25. What is a knife switch?_____
Can you show me one?_____

26. What are conductors?_____

27. Why do we need fuses?_____

_____

28. Electricity is made up of little particles. What are these called?____

_____

# ELECTRICITY

## TWO KINDS OF ELECTRICITY

We sometimes think of two kinds of electricity; static and current. Both are really the same.

Static electricity consists of electrons that are not moving.
Current electricity consists of moving electrons. Current electricity produces important magnetic effects.

## HOW WE CAN MAKE STATIC ELECTRICITY

1. Comb your hair until you hear it crackle.

2. Walk across a carpet on a cold day, shuffling your feet. Touch another person or metal.

3. Rub a comb with a piece of wool.
The atoms in the wool lose some of their electrons, and the atoms in the comb gain them. So the comb becomes negatively charged and wool becomes positively charged.

4. Rub an inflated balloon on your hair and bring it near some fine paper or cork particles (charged object attracts an uncharged object).

5. Rub an inflated balloon with a piece of fur or on a coat sleeve and stick it to a wall or ceiling.

6. Rub a comb and hold it near some bits of paper.

7. Hold two strips of newspaper together. Stroke them lenghthwise with your thumb and forefinger. Why do they repel each other?

8. Rub a fluorescent light bulb with a piece of fur or flannel in a darkened room. What do you observe?

9. Place pieces of paper underneath a sheet of glass resting on two books. Rub the glass with silk or flannel. The papers begin to jump about in an amusing way.

   It is the charge induced on them by the charged glass which causes them to be attracted. When they have given up their charge they fall back again. The paper can be cut out in the shape of frogs.

10. Cut small horses from a piece of folded paper so that they will stand on a table. Rub a hard plastic comb or fountain pen with fur and notice that you can pull the paper horses along the table. With several horses, you can have a horse race.

    (These experiments work best when the air is dry).

A substance does not always have the same charge when rubbed. For example, if you rub a piece of glass with silk, the silk becomes negatively charged and glass positively charged. But if you rub a piece of rubber with silk, the silk becomes positively charged and the rubber negatively charged.

## CURRENT ELECTRICITY

Current electricity works for man. In order to conduct electricity, the atoms of a substance must have electrons that are free to move from atom to atom. Metals have such free electrons, and so metals make good conductors of electricity. Only the electrons move in metal conductors. Ions make up the electric current in liquids and gases that conduct electricity. Positive ions flow in one direction and negative ions flow in the opposite directions. In some materials, such as rubber and glass, the electrons are bound so tightly to their atoms that few can move. These materials conduct hardly any electricity. Therefore, they are known as non-conductors or as insulators.

The flow of electric current depends on three factors:

1) the pressure that causes the current to flow
2) the rate of flow
3) the resistance of the conductor

There are two main kinds of electric current: Direct and Alternating. Direct current flows in only one direction.

Alternating current rapidly reverses its direction of flow many times a second. Alternating current has little voltage drop when transmitted over long distances. Most of the electricity used in modern industry and homes is transmitted as alternating current and converted locally to direct current if required. It is necessary to use high voltage to conduct an alternating current efficiently over long distances. High voltage results when the alternating current passes through a step-up transformer. At distribution points, the alternating current passes through a step-down transformer.

## HOW ELECTRICITY IS PRODUCED

Batteries
Generators
Thermocouple

Photoelectric cell or electric eye-changes light energy to electricity. It has sensitive materials that give off electrons when light strikes them. A cameras light meter is a photoelectric cell.

HOW DOES A FUSE PROTECT US?

You will need:

dry cell
wire
bulb
socket
tin foil
block of wood
two thumbtacks

Cut a piece of tin foil. The center is as thin as a piece of wire.

Secure it to a block of wood with two thumbtacks. Do not push the tacks all the way down.

Strip about two inches of insulation away from the middle portion of two wires. Connect these wires to the two terminals of a socket.

Connect the other end of one of these wires to a dry cell terminal.

Connect the other end of the second wire to one of the thumbtacks of your fuse board.

Be sure that the stripped end of the wire is in contact with the metal of the tack.

Connect a third wire between the remaining dry cell terminal and the remaining thumbtack.

The light should go on. Lay a bare wire or any piece of metal across the two bare wires. The light will go out.

Did you see how the tin-foil fuse melted at the narrow part?

Why it works:

The light went on because the circuit was complete. Electricity flowed through the tin-foil fuse, as it does in our homes.

When you place a piece of metal across the two bared wires, you cause a short circuit. Electricity was able to flow back to the dry cell without passing through the bulb to light it.

The electricity that was not used by the bulb caused the wires to become hotter. The tin-foil strip melts at a lower temperature than the other wires. When this happened, the circuit was broken and no more electricity flowed.

The fuse protects us by burning out. If the fuse were not there, the wires would have become hotter and hotter. This could have resulted in a fire.

## MAGNETS AND MAGNETISM

1. What is a magnet?_____

2. What things does a magnet attract?_____

3. Does color make a difference?_____

4. Does shape or size make a difference?_____

5. Some magnets come from the ground in the form of a rock called lodestone. Some magnets are manmade. How can you make a magnet out of something?_____

6. Where are magnets used in your home?_____

7. Will magnetism pass through paper or cloth?_____

   Prove it._____

8. Can magnetism be turned on and off?_____

9. What are the two poles of a magnet called?_____

10. Examine a compass. What direction does the needle point?_____

11. Can you tell why the needle on a compass points in a certain direction all of the time?_____

12. Can you find the like poles on a magnet? What do they do to each other?_____

13. What do unlike do to each other?_____

14. What is a magnetic field?_____

15. Does the earth have a magnetic field?_____

    If so, where?_____

16. What is a temporary magnet?_____

## EXPERIMENTS

1. Show how electricity can make a bulb light up.
2. Does the shape of the wire make any difference? Experiment with difference. Experiment with different size wires.
3. Bring some things to school that electricity will go through.
4. Bring some things to school that electricity will not go through.
5. Demonstrate that electricity gives heat.
6. Make an electric magnet. Use an electromagnet to make a gong.
7. Demonstrate a complete circuit.
8. Look on page 183 of Science Near and Far and do the experiment.
9. Can you build a house and wire it for electricity?
10. Can you make a bell ring by using a dry cell, bell, wires and a switch?
11. Do an experiment with a magnet. Can you magnetize something?
12. Examine a compass.
13. You may do any experiment that you find in any book.
14. Explain a short circuit and demonstrate it.
15. Demonstrate seeing a fuse work. Use a piece of aluminum as a fuse.
16. Make an answer board.
17. Make an electric current detector.
18. Make an 11¢ battery.
19. Examine and make a compass.
20. Hook up lights connected in parallel position or a series.
21. Find out how to make current electricity.
22. Make a telegraph set.
23. Do an experiment with a magnet. Magnetize something as a pair of scissors, knife, needle, etc..
24. Learn to read an electric meter.
25. Explain what electricity is and how it gets into your house.

26. Find out how we measure electricity.

27. Read about switches and fuses.

28. Read about insulation and what it is.

29. Read about conductors.

30. Can you identify and describe a receptacle, a socket, a switch?

31. Learn as a panel about various dams in the United States and report findings to the class. TVA in Tennessee; Columbia River dams; etc. for example.

32. Have fun with the two-way radios.

33. Can you make the telephones talk by hooking them up a certain way? Take them apart. See what makes them work. Put them back together.

34. Hook up the steam engine to the machine shop and watch the engine drive the machines. Use a machine shop simulation.

## CAREER ENRICHMENT

1. Consider all of the workers who work in electronics' fields. This can be accomplished in small groups which class members form. When it is established that no one person can think of another trade, class members may go to the Occupational Exploration Kit and the Dictionary of Occupational Titles. Committees might decide to be responsible for a variety of information including job classifications, job tasks, salaries which can be earned, and the training needed for these jobs as well as the wearing apparel needed to do the job tasks. THE ENCYCLOPEDIA BRITTANICA and WORLD BOOK could be consulted, also. As a starter, some of these are: electronics engineer, electronics technician, engineering technician, electricians, electrical engineers and broadcast technicians.

2. Students could bring TELEPHONY magazine and other magazines which might be connected with these trades. The classified advertisements could be studied in these and analyzed in various ways. Content of the magazine could be examined to visualize the wide variety of current topics these kinds of workers study. For ideas please refer to Additional Random Activities for Elementary Grades, by Helen K. Dickson, Dec., 1971.

3. Students can refer to Career Explorations, Designs for Field Trip Reporting to decide upon some activities which will help them to remember what they have learned.

4. Tools of the Trade for the various occupations could be studied, and replicas could be made of clay or of paper mache'. Students should assemble a list of tools, reproduce them in the above manner, or through drawing and paper cutting, and should be able to identify them. Catalogues would be a very great help. Also, resource people. For additional help see Random Activities for Career Education, by Helen K. Dickson, Nov., 1971.

5. Students should be considering what kinds of electronics workers should be invited for resource information, and the kinds of workers and work which they would like to observe on a field trip. After these decisions are made, the list of business places available for field trips should be consulted as well as the list of local resource people. Perhaps the class has discovered someone not on the list. Consult them, they may be glad to come or have the class visit. The local BUSINESS DIRECTORY and TELEPHONE DIRECTORY should assist in this reference work.

6. PHYSICS IN THE SERVICE OF MAN is available for examination or information regarding work which is done by people understanding electricity and its principals.

## HOW TO MAKE AN ELECTRIC QUIZ BOARD

You will need:

dry cell
wire
bulb
socket
cardboard or box
nail

Use the nail to punch six holes down the left side of a piece of cardboard and six holes down the right side.

Place the end of one wire in any hole at the left and the other end in any hole at the right.

Strip the insulation from the ends of the wire and secure it in place.

Repeat this with the other wires.

You now have six wires in place in a haphazard way.

Set this aside for awhile. Connect a wire between a dry cell terminal and a socket terminal.

Connect another wire to the remaining terminal of the dry cell.

Now attach a third wire to the remaining terminal of the socket.

Touch the two free ends of the wires together briefly. The light will go on.

Hold the cardboard so that you cannot see how the wires are connected.

Place the name of a baseball player on the left side, which will serve as the question, and the name of his team on the right side, which will be the answer. (Prepare questions and answers for any subject you are studying.)

Be sure the question and answer are on opposite ends of the same wire.

Take the two free ends of the wires from the cell and socket. Now try to touch the matching questions and answers.

By touching the questions with one end of the wire, and the answer with the other end of the wire, the light will go on. This happens because the circuit has been completed.

## GROUP ACTIVITIES

| AUDIO VISUAL | SUGGESTIONS |
|---|---|
| 1. SVE Filmstrip and Record | Television Workers |
| 2. Educraft Filmstrips; Record | Electrical Workers |
| Educraft Filmstrips; Record | Telephone Workers |
| 3. Records | "The Thomas Edison Story"<br>"The Ben Franklin Story"<br>"The Robert Fulton Story" |

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## ADDITIONAL THINGS TO DO

Order out "Job Families of Watertown" for TV, electrical, and telephone workers. What can you tell about the work each one of these members on the job families do? What other related job families information can you discover?

If you cannot answer the above question, would not a field trip be in order?

## BIBLIOGRAPHY

| TITLE | AUTHORS | PUBLISHER | CITIES | PUB. DATE |
|---|---|---|---|---|
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| The How and Why Club | Frusier, George Willard et. al. | Singer Co. | Syracuse, N.Y. | 1949 |
| Magnets and Electricity | Podendorf, Ild. | Children's Press | Chicago | 1961 |
| True Book of Magnets & Electricity | " " | " " | " | 1965 |
| True Book of Science Experiments | " " | " " | " | 1954 |
| Safe & Simple, Project with Electricity | Neal, Charles D. | " " | " | 1965 |
| Science Avtivities From A to Z | Challand, Dr. Helen | " " | " | 1963 |
| Science for Here & Now, Book 2 | Schneider, Norman | D.C.Heath, Co. | Boston | 1965 |
| Science for You, Book 3 | | Ginn & Company | Indianapolis, Indiana | |
| Science for You, Book 4 | | " " | " " | |
| Science in Your Life | Schneider, Herman and Nina | D.C. Heath, Co. | Boston | 1965 |
| Science 2 | Mallinson, George G., et. al. | Silver Burdett | Morristown, N.J. | 1968 |
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| What Is Electricity | Syrocki, B. John | Benefic Press | Chicago | 1960 |

# ELECTRICAL WORKERS IN THE WORLD OF WORK
## Natural Resources & Environment Cluster

Intermediate — Awareness: Beginning Competency

Subject: Science

Piloted by: Vera Casey, Blanche Christenson

REFERENCES:

Watertown Science Guides
Pre-vocational Filmstrip EFC 204 World of Work Edu-craft

INSTRUCTIONAL OBJECTIVES:

Given a study of electrical workers in the World of Work, students will be able to identify electrical workers from a list of miscellaneous occupations.

INPUT:

The teacher will play a record and show the filmstrip applicable to it simultaneously.

Procedure:

Children should listen to the record and watch the filmstrip and be ready to answer questions pertaining to it which have been handed to them in advance. They role play the part of an authority for the answer to their particular question. The teacher should make sure that the child can read the question prior to the film and understands it.

OUTPUT:

* The role-playing authorities will answer the questions given them.
* The children will brainstorm a list of job-related fields in the electrical industry.
* A field trip will be taken to the BUREAU OF RECLAMATION.
* The children will write a description of the job family of the BUREAU OF RECLAMATION, and will identify the cluster to which they belong from the resource materials on career clusters.
* They will use the form ADVENTURES IN CAREER AWARENESS completing it.
* They will develop murals showing the different occupations. Each child will make a collage of magazine pictures of electrical workers.

Children will be expected to complete the work which they start. They may choose to work any of the above output lessons with a buddy. They should accept equal responsibility for the work, and this understanding should be arrived at before the work begins.

OUTPUT: (continued)

Children working on ADVENTURES IN CAREER AWARENESS should be aware of this responsibility, and in that case, five students should be assigned to report on an individual occupation at the Bureau of Reclamation. The Bureau people should be posted as to the requirement and asked if this is agreeable with them prior to the field trip.

EVALUATION:

Outcome:

From a list of 25 occupational workers, students should be able to identify a minimum of 5 electrical workers from a possible 8.

# DESIGN TO TEACH CORRECT USE, MANNERS AND APPRECIATION OF THE TELEPHONE

Communicative Arts Cluster

Intermediate — Awareness: Beginning Competency

Piloted by: E. Johnson, R. Arneson, Iris Lang

INSTRUCTIONAL OBJECTIVES:

Given language arts time to study about the telephone, the children will be able to:

* Identify and use basic tools, equipment, and materials associated with business, commercial, and industrial activities.

* A student needs to develop skills necessary for employment in the career of his choice.

INPUT:

Recognizing the need to teach children proper use of the telephone and courtesy, the teacher will:

* Ask how many telephones in their home.

* Discuss importance of the telephone--its various uses.

* Ask if they all have used a telephone.

* Discuss the importance of it as used by parents in places of business, store, law office, school, fire department, police department.

* Demonstrate rules in the correct usage of the telephone.

* Show common abuses in the use of the telephone: talking too long, playing with the telephone; etc..

Procedure:

All children should take part in the discussion and in the actual use of it. See activities in output. The physical setting of the room will be informal.

OUTPUT:

Children plan and demonstrate various types of calls. Business, friendly, appointments.

* Accomplish this by using models or toy telephones (work with a buddy).

* After each call discuss the positive qualities of each conversation.

* Bring old telephones if they are available and pictures.

OUTPUT: (continued)

* Have reports on the telephone as an invention. Play recording about Thomas Edison..

* For a Science project draw an illustration of the parts of the telephone and label each. Take a phone apart to get an idea of its intricacies.

* List all workers who contribute to make a telephone possible. Remember to list workers in plants such as Western Electric. Write the company to learn about them.

* For Language Arts, children could write about the telephone workers who they are most interested in, or the worker they might like the most to be.

* If possible, have a worker come to the class. (This should surely be done if one of the parents is of that capacity.)

* Visit a telephone company or exchange.

* Children brainstrom to imagine what would be different about home life without a telephone.

EVALUATION:

Level of Performance:

All children will be involved in activities according to their individual interests and abilities.

BEGINNING COMPETENCY

INTERMEDIATE
Level II

# ASSEMBLING A NEWSPAPER
Communicative Arts Cluster

Intermediate

Awareness: Beginning Competency

Subject: Language Arts

Piloted by: Connie Egan

INSTRUCTIONAL OBJECTIVE:

Given class newspaper instruction, students will demonstrate how to print, fold, staple, and assemble the paper in an assembly line manner.

INPUT:

Procedure:

In order to teach the assembly line process, the teacher will need to:

* Prepare the room.
* Set up work stations at a long table with each person assigned to a certain page.
* A person to staple, stapler, staples and filler pages are needed.
* Prepare the duplicator; etc..

OUTPUT:

* Two children should run the duplicator. One preparing the copy; the other running the machine.
* All children should participate around a table.
* A stack of material could be placed in front of each child.
* The child with the bottom page should start by handing his page to the person on his right.
* Each child in turn place his page on the top.
* Pass the pages collected to the right.
* The last child staples the paper together and folds.
* Boys and girls deliver the paper.

Visit the town newspaper to observe how workers and machinery print, fold, and assemble the paper.

EVALUATION:

Outcome:

Students will be able to describe collation of a school newspaper in sequence.

# SIMULATING WEATHER FORECASTING
## Natural Resources & Environment

Intermediate

Awareness: Beginning Competency

Subject: Science

Piloted by: Diane Kolbeck

REFERENCES:

Weather Forecaster; Skillcraft Co.; Montgomery Ward, Age 10 & up

INSTRUCTIONAL OBJECTIVES:

Given the Weather Forecaster Kit, the students will simulate the work of the weather forecaster, by reading instruments and plotting weather conditions.

INPUT:

Procedure:

The teacher will expose children through the use of the Weather Forecaster Kit.

An interest will be generated by students to perform some weather forecasting.

OUTPUT:

The children will make use of the kit as per instructions.

EVALUATION:

Outcome:

Children will be able to demonstrate how to use the Weather Forecaster, how to make a weather report on the basis of its use, and how to record the data learned in a logical manner.

# THE WORK OF A DRAFTSMAN
Construction Cluster

Intermediate

Awareness: Beginning Competency; Career

Subject: Social Studies

Piloted by: Geraldine Mahlen, Irma Opitz, Yovonne Shell

REFERENCES:

A blueprint--Career Development Materials

INSTRUCTIONAL OBJECTIVES:

Given information regarding the work of a draftsman with architectural design, students will be able to point out details on an architectural blueprint.

INPUT:

Establish two definitions of the word blueprint.

* A photographic reproduction in white on blue background, as of architectural plans.

* Any detailed plans or outline.

Acquaint children with the important values of a blueprint.

* It gives standards and reference points from which to work.

* Gives all the workers the same mental pictures of the finished project.

* It allows people of different trades to work on the project simultaneously.

Procedure:

Divide the class into small groups with each student participating according to his own ability of skills. Such as art, writing, and leadership ability. This will be done by the students in each group.

OUTPUT:

* Plan and take a field trip to visit the Drafting Dept. at the Lake Area Vocational Technical School.

* Using definition #2--have two groups prepare two bulletin boards or displays. The title being "Home Building Material."
--One group prepare with a detailed blueprint in hand.
--One group has only the title and verbal instruction.

* Allow small groups of 3 to contribute to a house plan of their own, designing various rooms in 3-D with construction paper--then move rooms together into a viable plan. (Make as nearly as possible to scale of houses one would like to own. (Attempt making to scale;

OUTPUT: (continued)

if too difficult for some, allow them to indicate the designs they would like. Make individual choices on a contract basis.)

Study group progress:

* Which group began with little or no confusion?

* Were members of both groups working with full knowledge of the finished project?

* Were all members able to work simultaneously?

* How much time did each group take?

EVALUATION:

Outcome:

Given an architectural blueprint, students will be able to point out a minimum of 1 detail shown on the blueprint, and will be able to define a blueprint in their own words.

BEGINNING COMPETENCY

INTERMEDIATE
Level III

# BUILDING A CITY
## Construction Cluster

Intermediate — Awareness: Beginning Competency

Subjects: Language Arts, Social Studies, Art

REFERENCES:

Recycled materials
The Story of Building a House, Eyegate, Jamaica, N.Y.
Encyclopedia Brittanica Film--Shelter
(This film will be shown to show the many kinds of shelter found all over the world.)

INSTRUCTIONAL OBJECTIVES:

Given the work tasks, construction, and decisions involved in the building of a house, students will be able to construct a simulation of a model city of houses, office buildings, shops, and parks.

INPUT:

Procedure:

* Students will be shown the filmstrips, THE STORY OF BUILDING A HOUSE, which includes the information revealed in the titles as follows:

  How It Started
  Excavating the Cellar
  Building the Foundation
  Building the Frame
  Gas, Electricity, Plumbing & Other Installations
  Further Installations
  Completing the Outside of the House
  Completing the Inside of the House
  The House is Built

* Encyclopedias and the resource center should be made available to them for further research.

* Pupils may be divided into groups. They should be allotted a minimum of four days to arrange the first reporting concerning their planning for construction of the city.

* Clay, scrap wood, paper mache', plaster of paris, and miscellaneous recycled materials are important to the construction planning.

* Students may need to contact city planners, financial people, architects, the city engineer and other resource people in order to make their simulation a valuable one. Economic understandings should play a strong part in the plans.

OUTPUT:

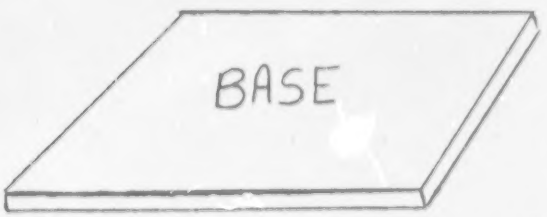
* Students will form groups, choose group leaders, contact resource people, complete further research, and construct their model city after viewing filmstrips and film.

* They may need to set up zoning ordinances and demonstrate good city planning practices as well as modern architectural design.

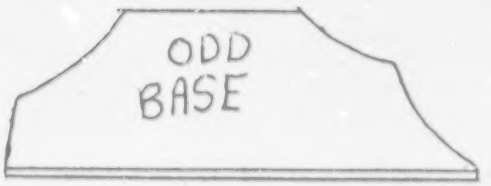
EVALUATION:

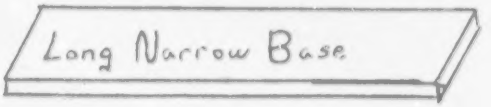
Outcome:

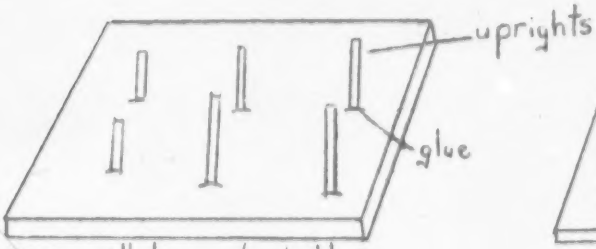
Students in groups, will demonstrate cooperative organizational planning, a knowledge of modern architecture, and city planning in the construction of buildings, within a simulated model city.



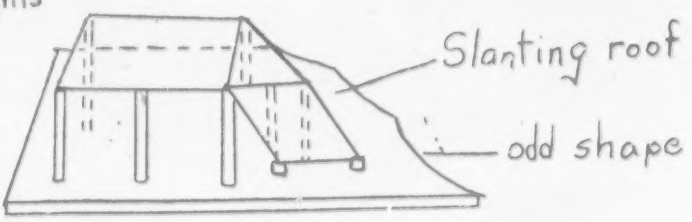

The Base represents the land or lot to be used

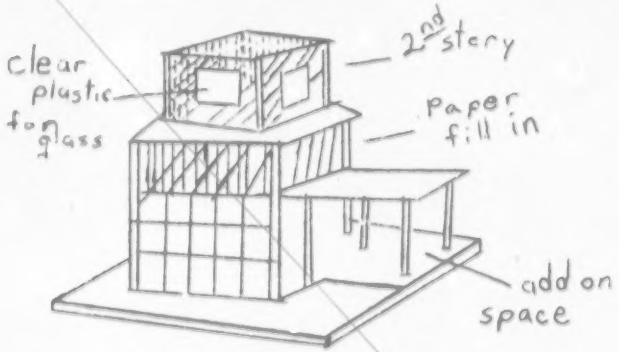


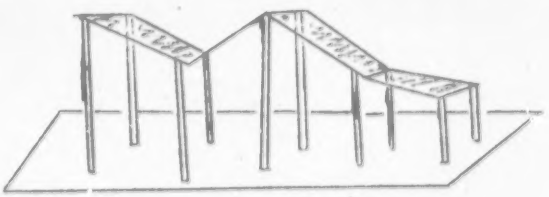



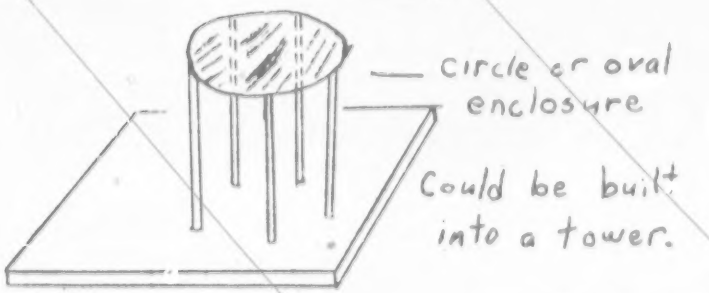

one will have to hold a little while the glue sets

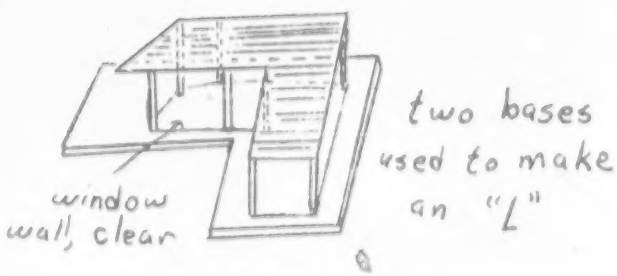


Varying Roof




Some recent Art Education material stresses that beginning Architecture Understanding should start in the Elementary as Enclosing or Adding space. The students could discuss the space outside the walls of their school or enclosed in their home.

# DISCOVERING MOTION

Natural Resources & Environment Cluster

Intermediate

Awareness: Beginning Competency

Subject: Science

REFERENCES:

Discovering Motion, ME 1200 (Kit)
Norelco-Mechanical Engineer--Mechanical--Electrical Knowledge; made and printed in Holland

INSTRUCTIONAL OBJECTIVES:

Given "hands on" experiences in constructing of over 40 different mechanical engineering items, students will be able to demonstrate for the class the basic principles of electricity, water power, air pressure, and gravity through examples of project construction.

INPUT:

Some of the projects shown in the instruction book are:
Clocks (spring, electric, self-winding); motors (all types); pumps (all types); dynamos (electric and hand operated); water turbine; cranes; pile driver & vehicles.

Procedure:

Two buddies will be assigned to read and select some directions which they would like to follow. One should be a good reader, if possible. Comprehension reading skills will be heightened when students read for the purpose of following directions.

OUTPUT:

* The kit is provided. What the students wish to produce is their decision.

* No soldering--unsafe.

* Can build and rebuild.

* Follow pg. 138 in the manual. Success will be measured by whether the students are able to get anything to work. Also, their ingenuity, resourcefulness, and drive will be observable.

EVALUATION:

Outcome:

Students will be able to demonstrate progress in understanding mechanical engineering by successful project construction. They will be able to explain the basic scientific principles involved in the project being built.

## (A) MANUFACTURING UNIT
Manufacturing Cluster

Piloted by: Adrian Paulson, Leland Albert

INSTRUCTIONAL OBJECTIVE:

Given a Manufacturing Unit, students will be able to simulate a stock sale, a board of director's meeting, applying for a job, and working in a factory.

INPUT:

The teacher will serve as a facilitator of ideas throughout the unit.

OUTPUT:

Students will work as buddies following through on unit experiments successfully.

EVALUATION:

Children will be able to tell about:

* the buying and selling of stock.
* what a board of directors meeting is.
* what a job application is.
* what working in a factory might be like.

# MANUFACTURING

## INTRODUCTION

We live in a rural area and have an economy that is basically agricultural. There are only a few small factories in the community.

Manufacturing accounts for more than three-fourths of the value of all goods produced in the United States. Over one-fourth of the country's work force is employed in manufacturing.

This unit includes a class project that gives everyone an opportunity to participate in setting up a corporation and manufacturing a product. By taking the roles of inventor, stockholder, board of directors, officer, manager, foreman, and worker each child will become better prepared to meet the "world of work."

## OBJECTIVE

A. Concepts

* Given a prototype of a product the students should be able to organize a company and manufacture the product.
* After the project is completed the students should be able to arrange in order the steps used in manufacturing a product.
* The student should be able to list ten different workers you would find in a factory.
* Given ten facts about a community the student should be able to tell which factors would encourage a company to build a factory in the community.

B. Skills

* Given a board and a measurement the student should be able to mark a board with a square and then cut the board to the correct length using a cross-cut saw.
* Given two boards, a hammer, and nails the student should be able to nail the boards together.

INSTRUCTIONAL PROCEDURE

* Pre-test
* Introduce unit
* Study unit
* Do the activities
* Organize and run a factory
* Final test
* Student and teacher evaluation

Types of Businesses

* One-owner
* Partnership
* Corporations
  "closed"
  "public"

Corporations

* Charter
* Stock
  Stockholders
  Stock certificate
  Stockholder's meeting
    proxy
    voter per share
  Stock dividends
* Board of Directors
  Election
  Duties

Organization of Corporation

* Stockholder
* Directors
* President
* General Manager or Plant Manager
  Production Manager
  Office Manager
  Sales Manager
  Worker in different department

Manufacturing

* Idea
* Design
* Prototype
* Capital
  stock
  loans
* Manufacture
  raw materials
  production control
  quality control
  research
  tooling-up and change over
* Sales
  wholesaler
  retailer
  consumer
* Profit or Loss

Manufacturing in the United States

* Chief Industry in U.S.
* Became leader during World War I
* U.S. produces ½ of worlds goods
* Manufacturing employs ¼ of U.S. workers
* One-third of our nation's income

Manufacturing Community

* Near cheap raw materials
* Large labor force
* Good transportation facilities
* Source of cheap power
* Favorable tax rates
* Adequate housing for workers
* Favorable climate
* One hundred factory workers create 125 other jobs in community

Government Helps Manufacturers

* Tariffs
* Subsidies
* Patents

ACTIVITIES

* Invite a small business man to visit the class and tell how he set up his business.
* Invite a banker or a stockholder to visit the class and tell the different ways a person can finance a new factory.
* Write a perspectus for a mythical company.
* Take a field trip to a factory in the community.
* Write a report on the contributions to manufacturing of industrialists Eli Whitney, Henry Ford, and Samuel Slater. Share the information with the class.
* Make graphs to show: value of goods produced, employment, leading manufacturing states.
* Prepare a bulletin board showing job opportunities in a factory.
* Make a list of safety practices that might be needed in a factory. Collect and display safety equipment used by workers.
* Conduct a stockholders meeting:
  call to order
  pledge to the flag
  secretary's report
  treasurer's report
  committee reports
  old business
  new business
  election of officers
  adjournment

## SUGGESTED STEPS FOR ORGANIZING A FACTORY

1. Find an item to be manufactured.
2. Conduct a feasability study.
3. Organize a company.
4. Sell stock to raise capital.
5. Hold a stockholders meeting.
6. Elect a board of directors.
7. Hire a plant manager.
8. Hire plant workers.
9. Purchase raw materials.
10. Organize work crews.
11. Manufacture product.
12. Inspect finished product.
13. Prepare for shipping.
14. Sell finished product.
15. Compute profit.
16. Distribute profits.

# BIBLIOGRAPHY

## Books

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Our Wonderful World, "Business in Action", Vol. 10, pp. 45-126, 1968

Pope, Billy N. and Ramona W. Emmons; Your World; Let's Visit a Furniture Factory, (Taylor Publishing Co; Dallas, 1969)

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The World Book, "Manufacturing", Vol. 13, pp. 125-130, 1971

## Filmstrips

"Raw Steel to Rolling Wheels", Edu-craft, Encyer-Geppert Co., Chicago, Ill.

"Working in U.S. Communities, Group I", SVE Education, Inc., Chicago, Ill., 1970

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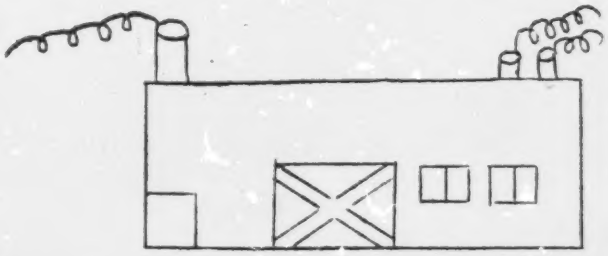
# APPENDIX

VALUE OF TEN CENTS PER SHARE



NO._____

SHARES_____

# GRANT CORPORATION

This certifies that_____ is the

owner of _____ shares of stock of the GRANT CORPORATION.

GC
GRANT CORP
BUILDERS

IN WITNESS WHEREOF, the said Corporation has its certificates by the duly authroized officer and to be sealed with the seal of the Corporation.

James Lee Kranz
Secretary

Peter A. DeWall
President

APPLICATION

Name _____ Job _____

Age _____ Experience _____

Social Security No. _____

Jobs

4 foremen
12 nailers
8 sawers
2 inspectors (assistant)
1 secretary
1 plant manager

TIME CARD

NAME _____

SOCIAL SECURITY NO. _____

POSITION _____

| DATE | IN | OUT | DATE | IN | OUT |
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PRE-TEST - POST-TEST

MANUFACTURING

Name _____

I. Sequence: Number the following steps used in manufacturing a product in the correct order.

_____ Make the product

_____ Design the product

_____ Sale to Consumers

_____ Build and test a prototype

_____ Inspect finisned product

_____ Distribute finished product

II. Multiple Choice: Put the letter of the answer that makes each sentence correct in the blank in front of each sentence.

_____ 1. The United States produces: a. 1/4, b. 1/8, c. 1/2, d. 1/3, of the world's manufactured goods.

_____ 2. Most of the chief United States manufacturers are located in a. western, b. southern, c. southwestern, d. northeastern, part of the country.

_____ 3. The chief industry in the United States is a. manufacturing, b. agriculture, c. mining, d. transportation.

_____ 4. For every one-hundred workers hired by a factory there are a. 75, b. 100, c. 125, d. 200, jobs created outside the factory.

_____ 5. The United States became the leading manufacturing nation during a. the Civil War, b. World War I, c. The Depression of the 1930's, d. World War II.

III. True and False: Write the word true in front of each true statement and false in front of each false statement.

_____ 1. Most big United States manufacturers are located in rural areas.

_____ 2. One-third of our nations income comes from manufacturing.

_____ 3. Stock dividends are paid to the worker in factories that make profits.

_____ 4. About one-fourth of U.S. workers are employed by manufacturers.

True and False: (continued)

_____ 5. The U.S. Government permits manufacturers to patent inventions.

_____ 6. Mass production of a product on an assembly line usually increases the production cost of a product.

IV. Plus and Minus: Put a plus (+) in front of each item that would encourage an investor to build a factory in a community. Put a minus (-) in front of each item that would discourage an investor from building a factory.

___ high taxes

___ cheap raw materials

___ large labor force

___ railway leading to large cities

___ no airports

___ two super highways

___ a shortage of houses

___ mild climate

___ low electric rates

___ located near a river

Place the letter of the group of words in Column B that best defines the terms of Column A in the blank.

Matching:

| Column A | Column B |
|---|---|
| _____ 1. Capital | a. specially trained workers check raw materials and examine finished products. |
| _____ 2. Profit | b. attempts to find new products and new uses for old products. |
| _____ 3. Manufacturer | c. money raised by a company used to finance the operation of a factory. |
| _____ 4. Research | d. making sure that the right materials in the right amounts go to the proper place at the proper time. |
| _____ 5. Consumer | e. the money left over after the cost has been subtracted from the selling price. |
| _____ 6. Retailer | f. individual or company responsible for turning a raw material into a consumable product. |
| _____ 7. Quality control | g. continuous line of workers, each with a specific job in production of a product. |
| _____ 8. Wholesaler | h. buys manufactured goods and sells them to stores. |
| _____ 9. Production Control | i. the individuals who finally buy and use a product. |
| _____10. Assembly line | j. operates stores that buy goods and then resells them. |

VI. Check: Put a check (✓) in the blank in front of each worker you would find in a factory.

_____electrician

_____secretary

_____production foreman

_____farmer

_____welder

_____minister

_____safety engineer

_____inspector

_____fork-lift operators

_____pay-roll clerk

_____custodian

_____security police

_____mechanic

_____assembly line workers

_____painter

_____shipping clerk

_____machine operators

_____supply clerk

_____receptionist

_____machinist

_____nurse

_____newscaster

_____travel director

_____fisherman

_____animal trainer

STUDENT QUESTIONNAIRE

MANUFACTURING

Did you enjoy our unit on manufacturing?

What did you like about the unit?

_____pre-test

_____stocksale

_____board of director's meeting

_____applying for a job

_____working in a factory

_____filmstrips

_____final test

What did you dislike about the unit?

_____pre-test

_____stocksale

_____board of director's meeting

_____applying for a job

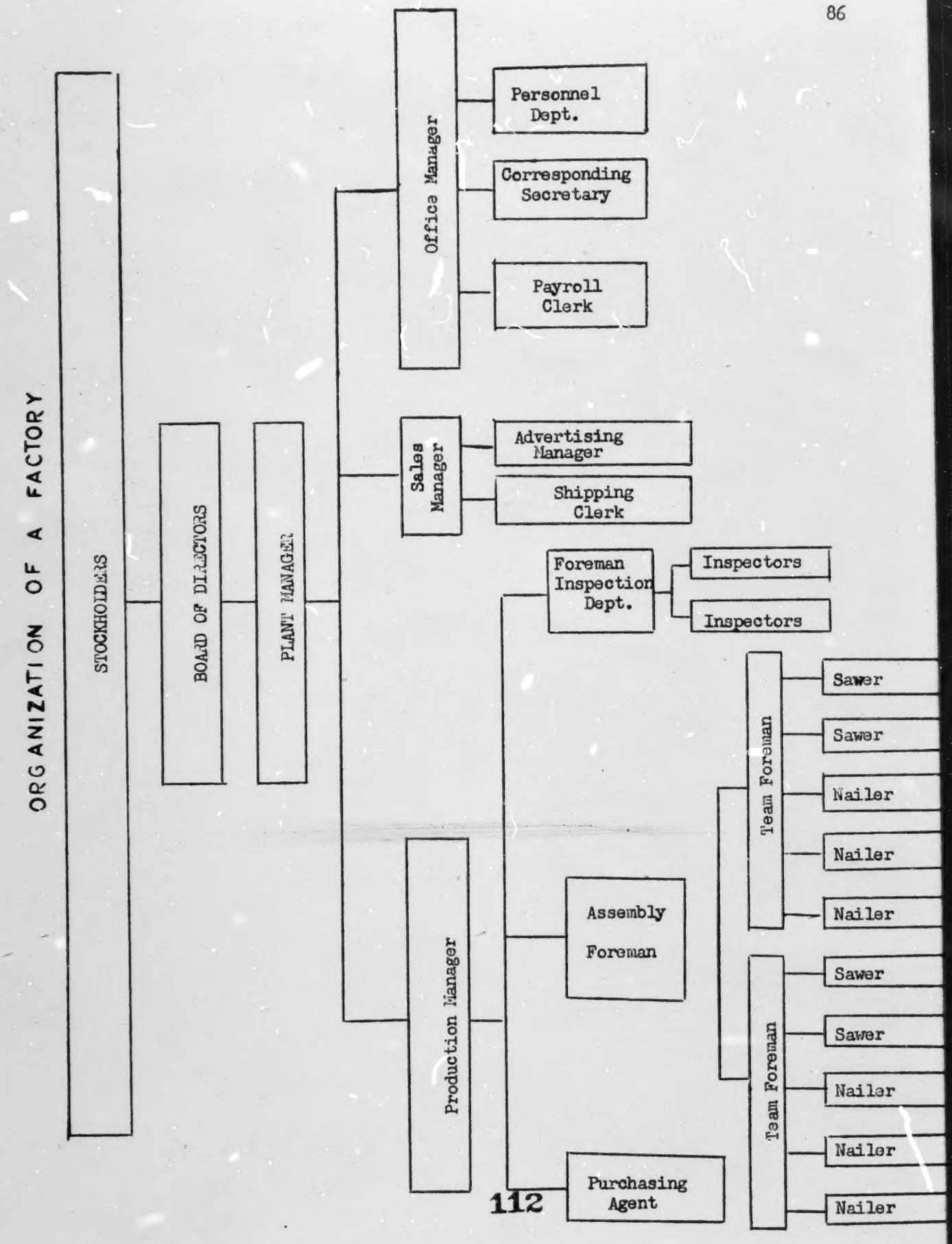
_____working in a factory

_____filmstrips

_____final test

How would change this UNIT?

Would you like to do something like this unit again?


ORGANIZATION OF A FACTORY
STOCKHOLDERS
BOARD OF DIRECTORS
PLANT MANAGER
Office Manager
Personnel Dept.
Corresponding Secretary
Payroll Clerk
Sales Manager
Advertising Manager
Shipping Clerk
Foreman Inspection Dept.
Inspectors
Inspectors
Production Manager
Assembly Foreman
Purchasing Agent
Team Foreman
Sawer
Sawer
Nailer
Nailer
Nailer
Team Foreman
Sawer
Sawer
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Nailer

# MANUFACTURING
## Manufacturing Cluster

Intermediate Awareness: Beginning Competency

Subjects: Science, Social Studies

Piloted by: Martin Weisbeck

INSTRUCTIONAL OBJECTIVES:

Given the proper equipment and instructions the students will observe and apply the process of manufacturing through mass production, of a power-converter unit.

INPUT:

* The teacher will introduce the concept of mass producing through an assembly line.
* He will arrange a field trip to a manufacturing company.
* He will present the proper assembly line procedures.
* He will arrange for the sale of the finished product.

Procedure:

* Students will be put in various sizes of groups according to the number needed at each work station.
* A station will be needed to measure the six different lengths of wire.
* A station for stripping wires and attaching ends.
* A station will be needed for soldering the indicator light.
* A final assembly station will be needed.
* The students will sell the finished product.

OUTPUT:

Students will completely assemble the power converter unit and have it available for resale. Students should have a complete understanding of assembly line manufacturing and mass production.

EVALUATION:

Outcomes:

Children will be able to tell:

* The uses of a power converter.
* The parts which make up a converter.
* What an assembly line is in manufacturing.
* How manufacturing and mass production make efficient operations.

# SIMULATING MANUFACTURING
## Manufacturing Cluster

Intermediate — Awareness: Beginning Competency

Subjects: Art, Social Studies

Piloted by: Olive Zwieg

REFERENCES:

Wrapping paper
Tempera paints
Drawing pens
Scissors
Staplers

INSTRUCTIONAL OBJECTIVES:

Given certain simple equipment, the intermediate class will be able to produce maxi-career dolls drawing on their information about careers and the special clothing worn in different occupations. They will discover the efficiency of planning and using the assembly line technique.

INPUT:

The teacher will provide students with samples of life-size dolls; will show them how to draw around each other to get proper physical shapes, will assign manufacturing teams, and will let students organize and choose foremen for the plan to manufacture.

Procedure:

* Plan choices of occupational people to be simulated.
* Plan their occupational dress.
* Plan the assembly line.
* Plan best use of simple tools.
* Plan painting.
* Plan clean-up.

OUTPUT:

Students will carry out plans and make revisions as needed.

They will try to:

* Be cooperative
* Be dependable
* Be interdependent

OUTPUT: (continued)

* Perform work well
* Provide a finished product
* Maintain some quality control
* Be organized

EVALUATION:

Outcomes:

Students will be able to:

* Make maxi-career dolls.
* Plan an assembly line.
* Work well as a cohesive group.

(4) ROCK UNIT

Natural Resources & Environment Cluster

Intermediate — Awareness: Beginning Competency

Subject: Science

Piloted by: Beverly Van Hyft

INSTRUCTIONAL OBJECTIVES:

Given a rock unit to encourage a hobby, students will be able to tell how rocks and minerals are formed, the three kinds of rock formations, and the names of a minimum of 7 rocks and/or minerals, plus several ways to test rocks.

INPUT:

See Unit

OUTPUT:

See Unit

EVALUATION:

Outcomes:

Students will be able to tell:

* how rocks and minerals are formed.
* three kinds of rock formations.
* names of seven rocks and/or minerals with 90% accuracy.
* a minimum of two ways to test rocks for identification purposes.

# CAREER EDUCATION UNIT TO ENCOURAGE A HOBBY COLLECTION

## ROCKS

### Lesson I

Objectives:

* To compare and contrast the formation of different types of rocks:
  sedimentary
  metamorphic
  igneous

* To differentiate and compare how a crystal, obsidian, and granite are formed.

Activities:

* Filmstrip, "Earth's Changing Crust: A Story of Our Earth"
  Questions for discussion:

  1. What are the 3 classes of rocks?
  2. What does sedimentary mean?
  3. How are sedimentary rocks formed?
  4. Give examples of common sedimentary rocks.
  5. What does igneous mean?
  6. How are igneous rocks formed?
  7. Give examples of igneous rocks.
  8. What does metamorphic mean?
  9. How are metamorphic rocks formed?

* Read Science 5, D.C. Heath & Co., May 1966. Pages 275-279.
  Questions for discussion:

  1. What does scoria look like?
  2. How is scoria formed?
  3. What are the characteristics of pumice?
  4. Demonstrate that pumice floats.
  5. What is pumice used for?
  6. What is quartz? What does it look like?
  7. How is granite formed?
  8. What is obsidian? Why does it have a smooth, shiny appearance?

* Observe rock collections. Examine rocks.

* One half of class examine sand crystals, the other half make crystals.

  1. See Science 5, page 277--Examine crystals. Materials: sand, magnifying lens, dark paper.
     Procedure: Boil 1 cup of water in a saucepan. Pour in 1/2 cup of salt. Stir until no more salt will dissolve. Remove saucepan from heat. Wait until salt that has dissolved settles to the bottom of saucepan. Carefully pour clear salt water from pan into a clean glass. Tie a small nail to a string and attach string to a pencil. Put nail in solution. Allow to cool for an hour. Examine. Did crystals form?

2. Draw pumice, scoria, quartz, obsidian, and granite in science notebooks. Above each, label the type of rock it is.

Lesson II

Objectives:

* To compare and contrast the formation of different types of rocks: sedimentary, metamorphic, and igneous.

* To demonstrate how pressure can alter layers of sediment.

Activities:

* See Science 5, page 283
  1. Draw examples of different types of sedimentary rock.
  2. How do they differ in appearance from igneous rocks.

* Read Science 5, pages 282-285
  Questions for discussion:
  1. What does sediment mean?
     a. Demonstrate sediment by building different layers of colored clay.
     b. Draw in notebooks, layers of different kinds of sediment.
  2. Why are there so many different kinds of sedimentary rocks?
  3. Why are sedimentary rocks important in the study of geology?
  4. What caused layers of sediment to appear at the top of a mountain rather than at the bottom?

* Experiment page 285, Science 5
  1. Fill a small metal or wood box with clay. Flatten top of clay and put a piece of wood over half the box. Put a brick on the wood. Push down on brick. What happens? Can this be illustrated or shown in nature?

* Enrichment Activities:
  1. Tape record oral reports on the rock formations in the Grand Canyon.
  2. Have class begin own rock collection - make bulletin board and attempt to classify rocks.

Lesson III

Objectives:

* To compare and contrast the formation of metamorphic rocks to the formation of igneous and sedimentary rocks.

* To demonstrate what happens when a marble is heated.

* Draw different types of metamorphic rock. See page 286, Science 5.

* Read pages 286--289, Science 5.
  Questions for discussion.
  1. What does metamorphic mean?
  2. Are there common examples in your life of changes caused by heating objects?
  3. What is slate? What does it look like? What is it used for?
  4. What is marble? How was it formed?
     a. Each child tests rocks he has brought in, for presence of limestone. Immerse your rock in vinegar. What happens? Why?
  5. What causes the heat that changes rocks?
  6. What is a rock cycle?
  7. How can a rock begin as a sedimentary rock and end up as a metamorphic rock?

* Summarizing questions:
  1. Why can you say that there is no such thing as an eternal mountain?
  2. Oral reports on uses of:
     marble
     granite
     limestone
     Carlsbad Caverns
     quartz
     How are diamonds formed? Illustrate.
     How are diamonds cut? Illustrate.

* Heat marble. What happens?

Lesson IV

Objectives:

* To do research for oral reports.

* To differentiate whether coal can be called a rock.

Activities:

* Draw formation of coal. Put in Science notebooks. Use supplementary science books, encyclopedias, filmstrips, etc..

* View filmstrip: "Coal, a Fossil Fuel".

Lesson V

Objectives:

* To present and tape oral reports of Grand Canyon, diamonds, etc..

## SUGGESTED CAREER DEVELOPMENT ITEMS TO ENHANCE UNIT

Utilize:

Rock Polishers
Rapco Tumble Stones
Mineralogy Laboratory

Interesting things to do:

* Polish rocks in tumbler in the school room. Give children the opportunity to see them in the different stages of polishing.

* Set them in rings and necklaces. Local stores can supply settings.

* Take a "rock-hound" trip to the Black Hills with money students have earned in various projects such as bake sales, a dramatic production; etc..

* Test various rocks for mineral content as directions with the mineralogy laboratory suggest.

* Have children investigate all of the occupations related to rocks and minerals, and make a notebook describing the occupations, salaries, as well as the tasks that workers should be able to perform, working conditions, and other details.

Suggestions of occupations to be investigated:

Soil scientists
Meteorologists
Geologists
Petroleum engineers
Petroleum exploration and production workers
Petroleum refinery workers
Metal mining workers
Metalurgical engineers
Mining engineers
Jewelers

Information can be found in the latest World Book, Dictionary of Occupational Titles, Occupational Exploration Kit.

How to use items:

Have the children bring their favorite rocks to school for tumbling in the rock tumbler.

Rocks which are polished in the mineralogy laboratory can be chosen for polishing in the tumbler, also.

Rock Hound Club:

Children can join a "rock hound club" for further interesting study of rocks and minerals. Geologic tours of interest could be formed. This is a wonderful hobby.

SUGGESTED BIBLIOGRAPHY

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A Child's Book of Stones and Minerals, Swenson, Valerie, Maxton Publishing, Inc., N.Y., 1955

The How and Why Book of Rocks and Minerals (Wonderbooks), Hyler, Nelson W., Grosset and Dunlavy Publ., N.Y., 1960

The Rock Book (too difficult for reading, pictures are very fine), Fenton, Carrol Lane and Mildred, Doubleday and Co., 1950

Rocks and Minerals, Irving, Robert, Alfred A. Knopf, N.Y., 1956